POPULAR Computing WEEKLY

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Vol 3 No 31

Acorn's new machine

ACORN is to launch its new up-market micro in September, aimed at professional, business and advanced home users

To be called the Professional Workstation Range the machine (previously called the ABM) will be offered in a variety of configurations

Each will include a built in monitor and disc drive, and use the 6502 chip — the same as is the BBC machine — as its "core processor"

The 6502 will not, however, be the main processor. It will be used as the controller — handling the keyboard, screen and input/output operations for a range of other second-processor options. At the low end of the Professional Workstation Range the machine will be offered with a Z80 processor running CP/M. At the upper end of the range the machine will feature the new 32/32 Motorola version of its 68000 chip series the 68032, running a Unix-like multi user multi-tasking operating system — possibly a version of Xenix.

"The Professional Workstation will be core compatible with the 6502. By adding different processors you will be able to add rims of functionality

continued on page 5



Slow start for MSX companies

MACHINES from the majority of the Japanese MSX companies will not now be available in quantity in shops here, in time for Christmas

The Hitachi, National Panasonic and Teleton MSX machines will not arrive until next year

Sanyo, Sony and Canon are all planning their MSX launches in October but, initially only limited numbers of Sanyo and Canon machines will be available. David Silver, Sanyo's product manager, commented, "We will be going for full production in early 1985"

Mitsubishi will be making a standard joystick and data recorder available at the same time with a printer to come in 1985. Sony and Sanyo will also

continued on page 5

Sinclair to drop 16K from plan

SINCLAIR has announced its plans for the Autumn and the 16K Spectrum is not included.

"We will will manufacture the 16K machine and sell it overseas, but it is not a product we will promote in this country this Christmas" confirmed Anton Boyes Sinclair's retail business manager "At the moment 95 per cent of our sales and most of the software is for the 48K machine."

The company has announced a special offer for the 48K Spectrum involving a free gift of £86 70 worth of software and both the QL and the flat-screen TV will be in the high street shops in September

From August 8, the 48K Spectrum will be sold with a free pack of six programs — *Chequered Flag*, *Scrabble Make-a-Chip*, *Survival*, *Chess* and *Horace Goes Skiing*. This 'Spectrum Six-pack' offer will continue while stocks — ¼m packs worth £14m — last, probably until the end of September

The Microdrives will also be sold as a special pack, from October onwards. With Christmas presents in mind, the Microdrive System Expansion

continued on page 5

Valhalla's follow-up

LEGEND'S follow-up to *Valhalla* is called *The Great Space Race*. Details inside

Vol 3 No 31

POPULAR Computing WEEKLY

)View

THE Japanese MSX companies work in mysterious ways.

Here you have the world's most successful electronics manufacturers deciding to jointly tackle the micro market.

Yet, instead of a unified launch by the ten manufacturers, well in time for the peak Christmas selling period, they have chosen to act separately, each with its own different launch schedule.

The timings look curious to say the least.

National Panasonic, Teleton and Hitachi will not launch until next year — Hitachi actually announced an '84 launch and then changed its mind. Mitsubishi is hoping for first deliveries in mid November — too late to make much headway at Christmas. And Sanyo and Canon, though launching in October, expect initially to have available only limited quantities of machines.

The only MSX manufacturers which look as if they may get enough machines in the shops to make an impact at Christmas are Sony and Toshiba.

All of which is rather nonplussing. MSX was launched in Japan at the tail end of 1983 and its planned arrival in the UK this Autumn was announced way back in the Spring of this year.

Sinclair, Amstrad, Acorn and Commodore must be watching the proceedings with considerable interest. Amstrad's distribution, which already looks pretty good, should ensure the machine success and Sinclair last week announced that its QL computer will be in the shops in September — again in good time for Christmas.

The MSX standard is a gamble which the Japanese companies will either win or lose.

Not until the Japanese manufacturers can present a concerted attack on the micro market will it be possible to regard MSX as a true 'standard'.

)Presents...

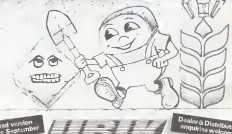
)Futures...

Baud Walk — a new weekly networking column... how good are the QLs now being shipped — any improvement...? and a program to give you windows on the Commodore 64.

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How to submit articles Articles which are submitted for publication should not be more than 2000 words long. The articles and any accompanying programs should be original. It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted. **Accuracy** *Popular Computing Weekly* cannot accept any responsibility for any errors in programs we publish, although we will always try our best to make sure programs work.

Paranoid PETE

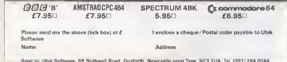


Amstrad version available September

UBIK SOFTWARE

Dealer & Distribution enquiries welcome

Due to the World Wide shortage of wheat, Paranoid Pete – the intrepid space farmer – has travel[illegible] effort to grow new crops and send them back to earth. The game starts when Paranoid Pete is be[illegible] to plant the wheat seeds as they fall from the U.S.S. Harvester. This is acheived by [illegible] with the spade and then filling the hole in, but it is not quite that easy as the planet ha[illegible] [illegible]liest little critters in the Universe" and Pete has to defend himself and his crops by [illegible] with his spade. Once his plant(s) have been successfully grown the arm of the [illegible] [illegible] the U.S.S. harvester for processing, subsequently, Pete is beamed [illegible] Mega wibblies have materialised on board and are intent [illegible] [illegible] eight boxes of Ubik-Wheat for every plant grown to gain [illegible] [illegible] these lives and five levels of increasingly difficult play can y[illegible] [illegible] and the Ubik Wheat for breakfast.



Acorn

continued from page 1

to meet all sorts of needs," explained an Acorn spokesman.

The additional processor units will be linked by a development of Acorn's Tube interface currently used with the second processor add-ons for the BBC machine "With The Tube we have a particular advantage over our competitors and we would be foolish not to use it," continued the spokesman.

Acorn's managing director Chris Curry

"What will come out in September will not be another QL — it will be a machine people will actually want to see"

Legal action over copying

DEVON Trading Standards Authority is the latest body to take legal action over software piracy

It received a complaint from Crystal Electronics in Torquay, that copies of its *Xtal Basic* program for the Sharp MZ80K and photocopies of the accompanying manual were being hired out in Yorkshire

Howard Austin, a nineteen year-old from Pudsey in West Yorkshire, pleaded guilty at Teignmouth Magistrates Court to three offences against the Trades Description Act, two against the Copyright Act and one against the Forgery and Counterfeit Act.

Michael Cheney, solicitor for the Trading Standards Authority, said, "We took the view that the accused was in breach of copyright of the printed word in that he was photocopying the program's manual It is a breach of the Trades Description Act to supply something protected as copyright as original when it is not, and we added the offence under the Forgery Act because he was passing the program and documentation off as genuine when it was a copy

"*Xtal Basic* was only one of the programs on Austin's catalogue of software available"

Austin was fined a total of £40 with £50 costs He was given a six month conditional discharge

MTX price drop

MEMOTECH will be cutting the price of its MTX 500 machine from September

Currently selling at £275.00, it will drop to £199 99 and five free games cassettes worth £30 will be included in the package.

Latest from Legend

THE eagerly awaited follow up to Legend's *Valhalla* is scheduled for October and will be entitled *The Great Space Race*

The program, described as a 'spectacular futuristic romp by Legend will be released for the Spectrum and the Commodore 64 simultaneously

At first glance the game looks like a radical departure from *Valhalla*. "It's a bit like an arcade game in that you are up against a clock and under continuous pressure but it has a richness of structure hardly found in even the best adventure and strategy games" says Legend's John Peel.

The game is seen as a further development towards the computer 'movie' concept. Like *Valhalla*, characters within the game exhibit independent personalities and the graphics are controlled by a computer 'director' "Not only are the graphic displays in true solid 3D but what you see depends on a complex logic controlled by the computer" continued John.

The plot of the game is in two sections In the first you compete with computer-controlled players to get the best machinery, stores, equipment and personnel for your spaceship The second section is the race itself — first to reach a distant corner of the universe

Unlike *Valhalla* which understands a range of typed-in instructions *The Great Space Race* uses a form of single-key press input. "What happens is that for any given situation a number of logical alternatives from which you may choose are displayed in the top of the screen — it is perfectly possible you may never get the same combination of alternatives twice in the game"

The game uses a special operating system Movisoft 2 as its basis — a development of the original Movisoft system used in *Valhalla*. By the time of its release Legend expects to have spent over £0.25m on its development believed to be the largest amount ever spent on the development of a single computer game.

MSX

continued from page 1

be launching peripherals — as yet unspecified — with their computers in October, while Yoshio Yamashita, product coordinator for Canon, said that as yet, no peripherals were planned from Canon.

The first MSX machine to arrive in the UK will almost certainly be Toshiba's — in September

The Toshiba 64K micro, called the HX 10, will cost £279 00, and Toshiba will be launching a standard joystick at the same time for £14 95 In October a printer/plotter called the HX-P570 at £249 00 and a dot matrix printer at £349 00 will be available.

According to Chris Greet, Toshiba's product manager, the plotter is "a four-pen device with a speed of 285 steps per second which takes any paper up to A4 size and connects with a Centronics interface"

The dot-matrix printer, the HX P550, prints at 105 characters per second over 80 columns. It operates with tractor or friction feed and again can use any paper up to A4 size It also connects to a Centronics interface.

However Toshiba's disc drive, originally based on the Sony 3½ inch drive mechanism and due here before Christmas will not now appear until next year 'We are now working on a 3½ inch disc drive of our own design and manufacture," continued Chris Greet "The first of these will come off the production line in Japan just before Christmas'

Sinclair

continued from page 1

Pack will consist of the microdrive and Interface 1 plus four microdrive cartridges These will contain an *Introduction To Your Microdrive* demonstration program, a 'utility cartridge featuring *Tasword 2* from Tasman and Campbell Systems' *Masterfile*, a games-orientated cartridge with Quicksilva's *3D Ant Attack* and *Games Designer* and a blank cartridge. Sinclair will be advertising on TV for the first time, with this package

Sinclair's managing director Nigel Searle cautioned that retail stocks of the QL and flat screen TV would be limited to begin with, and that demand would exceed supply Thorn EMI Datatech's production of the QL is being stepped up to 50,000 units per month, and Sinclair has appointed Timex as a second source for the manufacture of the pocket TV Two new sub-contractors, AB Electronics of Wales, and Samsung of Korea, have been appointed to assemble the Spectrum.

Nigel Searle also announced that Sinclair was within a week clearing the backlog of QL mail orders — 15-20 000 having been delivered. With the QL available on retail, mail order advertising has been discontinued.

● Scicon in conjunction with OE Ltd, will be producing a communications package for the QL. An interface with a terminal emulator comprises one pack, and a modem will also be available No prices have yet been fixed. More information from Scicon, 49 Berners Street, London W1.

WE are informed by Beau-Jolly, distributors of software under the Imagine label, that it has no evidence of cut price Imagine tapes having been sold to a German distributor as reported in *PCW* July 12.



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PRICE
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8 95
8 95
48 hour despatch

A turn for the worse

I thought I ought to write concerning your magazine. It has changed from a serious, slim, glossy magazine, to a more news-orientated one, to a games mag. Your editorials appear to be written by *Sun* journalists — short snappy and eye-catching. All definitely a turn for the worse.

I'm not too keen on the new layout either — but I'm sure I'll get used to it soon enough. And I've noticed the price-drop too. From 40p to Only 40p.

All I want to know is when is the £1,000,000 Bingo going to start?

Vincent Graff
147 Wynchgate
Winchmore Hill
London N21

These are one or two details still to be sorted out.

Help for the Beep

With reference to Richard Hyde's questions in *Peek & Poke*, July 19, concerning the Spectrum's *Beep* command, here are two simple-to-use routines which may help. Please note that the numbers preceded by # are in hex.

J D Dalton
3 Flaxen Walk
Warboys
Cambs

```
        MUSIC SUBROUTINE

MUSIC   PUSH BC
        PUSH HL
        LD   A (HL)
        CALL #2D28
        RST  #28
        DEFB #A4
        DEFB #04
        DEFB #04
        DEFB #05
        DEFB #38
        POP  HL
        INC  HL
        LD   A (HL)
        PUSH HL
        AND  127
        CALL #2D28
        POP  HL
        PUSH HL
        BIT  7 (HL)
        JR   Z MUSIC1
        RST  #28
        DEFB #1B
        DEFB #38
MUSIC1  CALL #03F8
        POP  HL
        INC  HL
        POP  BC
        DJNZ MUSIC
        RET

NOTES   DEFS 50 2

   TO USE THIS ROUTINE

   LD HL NOTES
   LD B 1   (NOTE COUNT)
   CALL MUSIC

   THE MAXIMUM NUMBER OF
   NOTES IS 255.
```

```
   DURATION IS SECONDS 100
   EG. 50 = .5 SECONDS
   MAXIMUM DURATION IS 255
   OR 2.55 SECONDS

   PITCH IS AS FOR BEEP

   FOR NOTES WITH A PITCH
   LESS THAN ZERO ADD 128
   TO POSITIVE VALUE
   EG   120 4-
        148 4-20

   MESSAGE PRINTING

PRMESS  PUSH HL
        LD   DE MESS
        CALL #0C0A
        LD   A 1
        LD   DE MESS
        CALL #0C0A
        RET

MESS    DEFB 128
M0      DEFB 22 10,11
        DEFM "HELLO"
        DEFB 160
M1      DEFB 22 11 10
        DEFM "GOODBY"
        DEFB 197

   TO USE THIS ROUTINE

   DE TO POINT TO TABLE
   OF MESSAGES

   A TO CONTAIN MESSAGE
   NUMBER

   THE ROUTINE AT #0C0A
   PRINTS THE A th MESSAGE
   IN THE TABLE STARTING
   AT ADDRESS DE.
   IT REQUIRES THE LAST
   CHARACTER OF THE
   MESSAGE TO HAVE ITS BIT
   7 SET ie CHARACTER +
   128.
   BECAUSE OF THIS IT
   CANNOT BE USED TO
   PRINT UDG S
   CONTROL CHARACTERS CAN
   BE USED eg. AT TAB
   INK etc
   THESE CAN BE FOUND ON
   PAGE 183 OF THE MANUAL
   NB TAB REQUIRES 2
   ARGUMENTS ????  ))
```

Correct order

Thank you for printing my *Moonlander* program in the June 28 issue.

Unfortunately certain parts of the listing have been printed in the wrong order. To get the program to work first type in Lines 1 to 380 from page 37. These should be saved onto tape as the first part (instructions and UDGs). Then type in Lines 1 to 330 from page 38, followed by Lines 400 to 1060 from page 37 — making the second part (the game). This should then be saved to tape immediately following the first program. Then it should work.

Darren Paterson
Corby
Northants

No sex please . . .

Recently you have been carrying an advertisement for a program called *Glass Kiss* from Titan Programs and I feel I must complain.

This is a sex game and the sooner the government bans games like this the better. As for the magazine, I am shocked that you would even accept an advert of this kind. I hope that you will refuse to take adverts from this company in future.

Christopher Bryant
11 Havenview Road
Seaton
Devon

PS I was thinking about subscribing to your magazine but now I've had second thoughts.

We looked at the game before accepting the ad and, while the game may be offensive to some — it is certainly degrading to women, by no stretch of the imagination could it be described as pornographic. In fact I would say the ad may even be a bit misleading. But then, anyone who buys programs in "discreet" brown-paper packages deserves to be disappointed.

Who will be left behind?

We, as Britons and Europeans, are firmly setting our feet on the road that leads into the dark ages of computer technology.

While British and European manufacturers are developing separate systems which are, almost certainly, by design, not software compatible the Japanese have between all their major electrical companies produced one specification — MSX — and all their machines are software compatible.

It is fashionable for people in the industry to scoff at MSX for being out of date, but are we not failing to appreciate the significance of the principle of MSX — the Japanese are working to one standard? At the moment in Europe there is a small body desperately lobbying the high-tech interest groups to agree on a standard computer interface!

Recently Sir Clive was talking excitedly on the TV about the Fifth Generation and AI. The generation of those who will be producing the Fifth Generation are now or will soon be cutting their milk teeth on today's home micros and small business computers. Who would you put your money on to be the first to develop AI? A country where the industry is working together and by consequence pooling its efforts. Or a group of countries where the manufacturers on the whole strive to tell the poor incompatriate that *they* are 'the only one in step' and sell them systems that run only system-tailored software?

John Mawhood,
72 Haslewood Road,
London SW18

But it won't feel right. Can't I pay for it now and then wait?

CP/M users take note

In *Peek & Poke* in the July 12 issue David Brown of Whitby, North Yorkshire asks if there is an organisation which loans or gives away CP/M programs. Your answer amounted to saying that no such group existed.

You may have overlooked the CP/M Users Group — CPMUG — or its newly formed British branch, CPMUGUK. Its address is 72 Mill Road, Dartford, Kent. Although it doesn't exactly give away its programs free, once you are a member you may obtain any one of a large collection of CP/M software titles for the price of the disc plus a nominal charge for copying. This is normally onto 8inch discs but a firm called Grey Matter (regularly advertising in *PCW* and other magazines) can solve the format problem. All this software is public domain, and much of it is extremely useful.

L L Fahidy
58 Castle Drive
Horley
Surrey



LEGEND


RACE
MOVI SOFT
2

Delta Queen

Pilot your paddle steamer up the Mississippi in John de Rivaz's game for the 16 or 48K Spectrum

As captain of the *Delta Queen* you must navigate your way safely up the Mississippi, avoiding the coast, the banks and the bridge supports stretched across the river at various points.

The program could form the basis of a much more involved program but as it stands it gives a good game and is still a fairly short listing to type in. For example, one idea would be to give the steering an inertia factor more appropriate to a sluggish river boat.

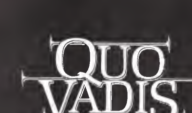
The score increases with every unit you progress. Hit any object, though, and the *Delta Queen* will veer off into open water — an event announced with a little beep.

Program notes

130-180	Set up machine code with checksum for any size Spectrum
230-280	Print instructions and prepare the screen
290	Draw coast and initialise river banks
300	Main loop entry point.
300-380	Draw a line of picture
380	Put in random bridge supports
410	Note last ship position
430-450	Get user-move and check on screen
460	Check for collision, if so zero score and centre ship
470	Unplot last ship's position
480	Plot new ship's position
490	Scroll bottom ⅔ screen and update score
830-870	If ship hits land or bridge, then push it to open water
860	Line inserted in case random routines contain a bug that causes river to be blocked!



```
 130 REM Set up machine code
 140 REM ___________________
 150 DATA 17,255,71,33,32,0,25,229,213,17,0,88,237,82,209,225,56,5,33,125,92,53,
201,167,6,32,203,22,43,16,251,33,32,0,25,235,24,221
 160 LET rt=PEEK 23720+256*PEEK 23731
 170 CLEAR rt-39
 180 LET rt=PEEK 23720+256*PEEK 23731
 190 LET test=0: FOR f=rt TO rt+37: READ a: LET test=test+a: POKE f,a: NEXT f: I
F test<>3608 THEN  PRINT "Data error!": STOP
 200 LET score=0
 210 REM Print instructions etc.
 220 REM _______________________
 230 LET s$="                                ": PRINT #1;AT 1,0; PAPER 1;s$;: BO
RDER 1
 240 CLS : PRINT "River Navigation:   23 June 1984"
 250 PRINT  PAPER 5;s$
 260 PRINT  INK 7; PAPER 1;"You see a coast approaching. Youmust steer your ship
 "".""  upriverusing  the  6  and 7 keys.  Yourscore  rises  with  every  unitpa
ssed, but is reset to zero  ifyou hit anything. Avoid bridges."
 270 REM print coast and estuary
 280 REM _______________________
 290 LET r1=50+50*RND: LET r2=10: LET j=r1-5: PLOT 127,j: PLOT 255,111: DRAW 0,r
1-111: PLOT 255,r1-r2: DRAW 0,-r1+r2
 300 LET score=score+1: LET r1=r1+1-INT (3*RND): LET r2=r2+0.5-RND
 310 IF r2>20 THEN  LET r2=20
 320 IF r2<10 THEN  LET r2=10
 330 IF r1>111 THEN  LET r1=111
 340 IF r1<r2 THEN  LET r1=r2
 350 PLOT 255,r1: DRAW 0,111-r1: PLOT 255,r1-r2: DRAW 0,-r1+r2
 360 REM print bridge caissons
 370 REM _____________________
 380 IF RND<.05 THEN  FOR n=r1-r2 TO r1 STEP 2+2*RND: PLOT 255,n: NEXT n
 390 REM user move
 400 REM _________
 410 LET lj=j
 420 LET a$=INKEY$: IF a$="6" THEN  LET u=RND: LET j=j-1
 430 IF a$="7" THEN  LET u=RND: LET j=j+1
 440 IF j>111 THEN  LET j=112
 450 IF j<0 THEN  LET j=0
 460 IF POINT (128,j)=1 THEN  BEEP .5,.5: LET score=0: GO SUB 530
 470 PLOT  INVERSE 1;127,lj
 480 PLOT 128,j
 490 LET u=USR rt: PAPER 5: PRINT AT 1,0;s$(LEN STR$ score+7 TO );: PAPER 7: PRI
NT  PAPER 2; BRIGHT 1; INK 7;"Score ";Score;
 500 GO TO 300
 510 REM Stop sailing on land!
 520 REM _____________________
 530 LET jp=j: LET jn=j
 540 LET jp=jp+1: IF jp<111 THEN  IF POINT (128,jp)=0 THEN  LET j=jp: RETURN
 550 LET jn=jn-1: IF jn>0 THEN  IF POINT (128,jn)=0 THEN  LET j=jn: RETURN
 560 IF jp>111 AND jn<0 THEN  CLS : PRINT "You have hit the end of the river!":
STOP
 570 GO TO 540
```



QUO VADIS

"[illegible] to [illegible] owners looking for a [illegible] this Autumn will [illegible]"

This is the modem world

Robin Wilkinson *explains how to get started with Networking on your micro*

Tired of all those games, frustrated with your latest programming attempt — then its time you got networking.

More and more services are opening up to let your micro do the walking across BT's public telephone network.

Modems are the hardware that allow your micro to connect to the telephone network and together with the relevant communications software open up a whole new world.

Public networking — connecting to such services as *Prestel* with *Micronet 800*, *BT Gold* the business electronic mail service and the recently announced *Compunet* — is catching on fast.

Add to that a proliferation of bulletin boards — private services where anything can happen! — other on line information retrieval systems and the ability to swap data with a friend's micro on the other side of the country and you can see how your micro can be turned into a highly versatile and powerful information terminal.

One couple in the States managed to use networking to date and later get married.

There's just one person you have got to keep an eye on — that's Buzby — and the telephone bill can come as quite a shock. But networking can be reasonably cheap if you restrict yourself to cheap call times and concentrate on databases which offer a local call access node (the jargon for a switch to a remote computer service housed in your local telephone exchange). Your time connected to the computer is charged as a local call.

If you really want to get serious, you could take out an account on the public switchstream service which allows you to dial services around the world at cheaper than normal rates — but the minimum payment is out of the reach of most home users who are just getting started.

There are no simple answers to getting hooked up and like everything it all depends on how much you are prepared to pay and what type of service you wish to access.

A list of service providers and modem manufacturers/distributors is shown in the two panels. Generally, modems will operate with a variety of software packages. When you get a modem you will also need the software so that your micro can make sense of what it is hearing from the modem.

Modems receive and transmit data at a variety of speeds — called the baud rate. Normally this will be (receive/transmit), 300/300, 1200/75 or 1200/1200 baud etc.

Modems with only 300/300 baud are generally cheaper ranging from £45. They can connect to a wide variety of services such as bulletin boards. However transmitting and receiving data at 300 baud can be slow and therefore has an overhead when it comes to your telephone bill.

Modems with only a 1200/75 rating have a more limited range of services available to them although this speed is beginning to gain acceptance on some bulletin boards. This speed is generally used for viewdata services like *Prestel* and *Compunet* where the host main frame or mini is transmitting more data to you than you are sending back to it. In this instance about 1K of data reaches you at 1,200 baud in around seven seconds. You send back at only 75 baud which is quite adequate for electronic messages but not really any good for uploading long files.

A typical *Prestel* page, for example, containing around 120 words (display is in teletext format) transmit in seven seconds. Costs for these 1200/75 only modems start at around £55.

More and more modems now couple 1200/75 operation with 1200/1200 — then you are really in business. You can transmit data back to the host quite quickly or to another micro providing you have the correct software and compatible modems. Costs for those more versatile units start from £70.

The ideal modem is one which combines all these facilities 300/300, 1200/75 and 1200/1200. Here the cost climbs to above £125 but with component costs still falling and interest high, you can expect prices to drop in early '85.

There is also a wide variety of terminal emulation software around

MICRONET 800 (C) 600006
11 What's New today
12 Daily News
13 Software reviews
14 Your letters
15 Other features
21 BBC programs
22 Spectrum programs
23 Software feedback
24 Other programs - Apple,Pet,Tandy
31 Electronic mail,telex & directory
32 Contact your own bulletin service
33 Talkback to Micronet 800
41 Advertisers by subject and A-Z
42 Swap Shop
43 Major Sub Information Providers
You can reach this guide to Micronet 800 by keying #1 from any page

Below is a compilation of services available to modem owners, together with the baud speed of the access ports. It is well worth checking, where possible, with the system operator, to see whether your software is compatible.

MAJOR SERVICES

Prestel Microcomputing including Micronet 800 and Viewfax 258.

A viewdata service running at 1200/75 baud with local call access around 92% of the country. There is also 300/300 baud access, but only on a London number. Minimum subscription is £20 per year for *Prestel* and £32 a year for the microcomputing section which offers news, downloading of free and commercial software, electronic mail, telex and teleshopping.

Contact *Micronet 800* (Tel. 01 278 3143) or *Viewfax 258* (Tel. 021-705 0258).

Compunet

A viewdata system with advanced features for personal computer operated jointly by Commodore and the ADP Network. Local call access at 62 points around the UK. Facilities include ability to upload your own software or information to the host system. Launch date of service is late September. Port speeds 1200/75 baud.

Contact ADP (Tel. 01-637 1355) or Commodore Information Centre (before August 17 Tel. (Slough) 74111. After August 17 Tel. (0536) 205252)

BT Gold

Really an up-market electronic mail teletext system but does have special interest group bulletins. Port speeds 1200/75 or 1200/1200 baud. Mainly for corporate company communications. Tel. 01-403 6777

Dialogue

A mammoth database with access via PSS or direct to London. *Dialogue* contains numerous distinct databases on subjects from world affairs through to chemistry economics and has a special microcomputing section. Operates at 300/300 or 1200/75 baud. You do not need a special PSS account to use (Tel (0865) 730969). SEMI-COMMERCIAL SERVICES

Maptel

Run by Maplin Electronics, provides tele-ordering of equipment and software using credit-card to existing customers. Runs at 300 baud. (Tel (0702) 552941)

Distel

Run by Display Electronics, *Distel* offers tele-ordering but also bulletin board-type facilities, gossips and news. Runs at 300 and 1200/75 baud. Contact Dave Fisher on (Tel 01-679 1888)

UK BULLETIN BOARDS — ALL FREE

Most bulletin boards operate during the evenings and weekends. Be patient — most operators do it for a hobby. If you get in real trouble type *Help*. Some magazines are even offering their own BB boards now.

CBS South West — Tel (0626) 890014 *Mailbox 80 W Midlands* (0384) 635336 *Forum 80 Hull* — (0482) 859169 *Forum 80 London* 01-902 2546 *CBBS London* — 01-399 2136 *Liverpool* — 051-428 8924 *TBBS London* — 01-348 9400 *BASUG* — (0742) 667883 *Computer Answers* London* — 01-631 3076 *CBBS Surrey* — (04862) 25174 *Blandford* — (0258) 54494 *Southern BB* (0243) 54494 *Birmingham* — (0827) 28810 *Stoke (ITEC)* — (0782) 265078 *West Midlands* — 021-631 3076 *Microweb (BBC Micro User)* — 061-456 4187 *Chiltern* — (07073) 28723 *City London** — (01-606 4194). *Cumbria** — (093) 92214. *Manchester* — (061-427 3711. **Note**. Most BBs operate at 300/300. Those with an asterisk are believed to work at 1200/75.

for home microcomputers ranging from the ZX81, Spectrum, Commodore 64, Dragon, Oric, and BBC up to big blue IBM, Sirius and Apple.

Most public database providers recommend certain modems and software, which they know operate will with their particular database. Make sure you check on the versatility of the software to connect you to other systems

If you are looking for a very cheap entry into networking you can do no worse than get a 300/300 modem. Try a user group or a small ad in *PCW* for second hand one. You



could pick up a cheap modem for £25 and you may get the software for bulletin boards free. However, the level of service and quality of information on these amateur boards varies considerably and they have severe limitations on the number of simultaneous callers possible, and usually only operate at evenings and weekends

You will find most bulletin board (BB) operators to be enthusiastic and helpful. One of the longest standing is Fred Brown from Hull who operates mainly for Tandy users.

Some commercial services, and indeed some amateur services are beginning to offer 1200/75 and 300/300 communications.

Professionally operated databases called Remote Computer Services are growing at a rapid rate. They normally operate at 1200/75, 1200/1200 or higher speeds. Examples of these are *Prestel* with a special microcomputing section currently supporting Spectrum, BBC, Commodore 64 and Apple users. *Compunet* for the Commodore 64 (launch due late September) *BT Gold* an up market electronic mail service with some other features *Dialogue*, a vast database aimed at researchers: *World Reporter*, a joint BBC/Datasolve service of world news, *Maplin* a catalogue shopping database, and *Distel* a semi-professional bulletin board with commercial teleshopping too, for electrical components.

Robin Wilkinson is a freelance electronic publishing consultant.

Next Week *Popular Computing Weekly* begins a new weekly networking column — *Board Walk*.

Any readers with experience of public networking services are asked to send their experiences or news of new services to Robin Wilkinson, PCW, 12-13 Little Newport Street, London WC2R 3LD

He can also be contacted on *Prestel* mailbox 019993737

Listed below are the major companies who supply modems for the home microcomputer and small business markets. Some sell only modems, others offer modems with a variety of software packages.

Remember, for simple bulletin board use, readily available terminal emulation packages are available often from the bulletin board operators or user groups. Send a SAE to operators who in most cases will be pleased to help

Large database operators will often offer more complex software tailored to their systems. In some cases you will need to identify the types of services you wish to use the modem for and buy one or perhaps two software packages.

Prism Microproducts, 18-29 Mora Street, City Road, London (Tel. 01-253 2277)
Prism offer a variety of modems and software packages mainly for viewdata use and user-to-user. Their modems can be used for bulletin boards with 1200/75 access but you will need to acquire the software

VTX 5000 — purpose built for the Spectrum with software for viewdata and user-to-user. Cost. £99 95 but enquire about rental scheme also. Bauds: 1200/75 1200/1200
Modem 1000 — with software on ROM for the BBC to access viewdata and user-to-user. Cost. £89 90. Baud. 1200/75 and 1200/1200
Modem 2000 — This modem has software controlled send and receive. Available for the Apple with software. Cost. £120. IBM PC Sirius and Apricot. Cost. £258 58 including *DBase II* run-time viewdata and user-to-user. Bauds: 1200/75 and 1200/1200

Tandata, Albert Road, Malvern, Worcs (Tel (06845) 06451)
Tandata offer two basic modems with a variety of software packages. Again some are tailored for viewdata.

Tm110 — basic 1200/75 baud modem, autodial. Price £99
Tm120 — same as Tm110 but also with 75/1200 1200/1200 and 300/300 baud rates. Cost: £158
Software packages available for both. BBC (£17) Apple II and IIe (£40 or £75), Commodore Pet (£63), Commodore 64 (£42) Vic 20 (£27) IBM PC (£150) and CP M machines (£125)

Minor Miracles, PO Box 48, Ipswich (Tel (0473) 50304
Company supplies the WS2000 modem which is currently awaiting final BT approval and runs at various speeds.

WS 2000 — 300/300 600/600, 1200/1200 baud. Compatible with European and American (Bell) standards. Cost: £126 91 inc P&P. Software offered for BBC and Apple

Pace Systems, 92 New Cross St, Bradford (Tel (0274) 729306)
Originally better known for producing the excellent Commstar software for the BBC, Pace have now launched their own modem.

Nightingale — 300/300 and 1200/75 baud. Compatible with European and Bell standards. Cost. £136 85. Software for the BBC (*Commstar*) £34 and Apple either software plus card £120 75 or software £69 and serial card £81 75

OEL Ltd, North Point, Gilwilly, Industrial Estate, Penrith, Cumbria (Tel (0768) 55748).
A long established company offering a variety of modems and software packages

Pac M1 — An acoustic modem, 1200/75 baud. Cost. £99 94
Telemod 1 — A 300/300 baud answer and originate modem. Cost: £99 94
Telemod 2 — 1200/75 and 1200/1200 baud modem under software control. Cost: £24.96
VTX 5000 — Operates at 1200/1200 and 1200/75 baud with integral Spectrum viewdata software. Cost: £99 95
Software is available for a variety of micros from the BBC cassette viewdata software at £13 00 to Commodore 64 cartridge allowing access to a wide range of services at £74 70

Interlekt Electronics, Reacis House, Portman Road, Reading (Tel (0734) 589551)
Portman — a main standard modem offering 1200/1200 and 300/300 and 1200/75 baud with other refinements. Cost £228

DaCom Systems, 16 Alston Drive, Bradwell Abbey, Milton Keynes (Tel (0908) 676757)
Buzzbox — Standard 300/300 baud modem. Cost £75 55
DSL 2123 — 1200/1200 1200/75 300/300 and 75/1200 baud modem. Cost: £280

Display Electronics, 28-32 Biggin Way, Upper Norwood, London (Tel (01-679 4414).
The company offers its own bulletin board service and specialises in stocking very cheap modems which have been superceded by more fashionable looking ones. However if you don't mind a box at least as big, and if not bigger than your micro, then try them. Software, though, is not supported.

BT 20 — standard robust 300/300 baud modem. Cost £57 44
BT 28 — standard 1200/75 baud modem. Cost £97 75

Maplin Electronics, PO Box 3, Rayleigh, Essex (Tel (0702) 552911).
Maplin also run their own service for catalogue subscribers and provide their own 300/300 baud modem in kit form for £49 00

Note Some modems are sold without British Telecom approval and your BT engineer — unless the modem is acoustic and does not require a jack point — may refuse to install a socket (if you haven't already got one) if there is not a green triangle approval sticker on your hardware

Reviews

Confusing

Program *Dix Mille* **Micro** Spectrum 48K **Price** £2 59 **Supplier** CCS, 14 Langton Way, Blackheath, London SE3

I was surprised to see this game, as it's the first CCS game I've come across at the cheap price of £2 59

They well may try to maintain their old prices for their old games, but since this is no better or worse than their others it seems a little confusing

Dix Mille is a very simple gambling game, using dice Because the instructions were very unclear though, I spent more time trying to find out how to work the game than I did actually playing it. The game shows reasonable graphic representations of the six dice with which you gamble but after one or two go's, watching them gets rather monotonous, as the screen display rarely changes (only to offer you a new game!)

I have been much unpressed by some of the other cut-price software around, in particular from Mastertronic and Atlantis, but this program from CCS is not as good — even though it costs £1 more

One advantage of *Dix Mille* is that, since it is written in Basic and is totally unprotected, you are able to *List* it to see what techniques the programer has used That said, the game is very badly written, and with care could almost certainly have been fitted into a 16K computer — at the moment it is just for the 48K Spectrum.

Sorry CCS, but you'll have to do better than this, even at the low price It is cheaper to buy any micro magazine such as this where the games listed inside are just as good.

David Lester

Amusing

Program *Wordgram* **Micro** BBCB **Price** £9 95 **Supplier** Daco Software, 48 Mackenzie Road, Moseley, Birmingham B11 4EP

After the cleverness of *Readright* and *Storyline* this latest offering from Daco is a disappointment

It sets out to help people learn about parts of speech, nouns, verbs, adjectives, conjunctions. Like the others in the series it encourages the user to write little stories so that there is a creative aspect to the exercises The resulting tale is often amusing From the start you decide whether to use formal grammatical names or brief decriptions (eg "nouns" or "words for people and things") A simple maco at the foot of the screen prompts you to pick a type of word, then offers one of that type If you accept it it joins the slowly building story at the top of the page Reject it and another is offered. The finished story can be shown on screen in pages or dumped to a printer

The snag is that the program cannot do much useful checking of the learner's responses All you really get practice in is recognising what sort of words are "verbs" or "words for action

Dave Watterson

Step forward

Program *Moder-80* **Micro** 16/48K Spectrum **Price** £8 95 **Supplier** Seven Stars Publishing, 15 Gloucester Avenue, London NW1

Moder-80 is a machine code disassembler and editor which, together with its companion Gener-80, a full assembler, gives very comprehensive facilities for writing, modifying and checking machine-code programs

It offers all the facilities you would expect from a machine-code de-bugging tool including the ability to display registers, to insert a breakpoint (at which they will be displayed) and to single step through a program, again seeing the registers, thus enabling you to discover exactly where (for example) an unintended jump is being made When an error is found the program can be modified using the simple assembly facilities Other features include full disassembly of machine code (including the ability to save the disassembled listing to tape for later use with *Gener-80*), Hex arithmetic and hex to decimal conversion, and writing both one and two byte numbers and Ascii strings directly into memory

The program is compatible with Interface 1 and can be backed-up to Microdrive

Simon Springett

Booby traps

Program *Bumpers* **Micro** Dragon 32 **Price** £7 95 **Supplier** Dragon Data

Bumpers is a maze game for either two players or for one player against the computer The opponents start off in the top left and bottom right points of the maze and the winner is the first to navigate to the opponent's start point

There are, as you would hope, some complications. The maze is initially invisible — all that is displayed is a matrix of dots showing the dimensions of the maze and it is only as you touch a wall that a small portion of it appears Further, dead-ends have one wall booby-trapped and touching that sends you back to the start point. You can zap your opponent when you cross over, in which case the zapped victim reappears at a randomly determined point on the maze

Each game is itself randomly generated and there is only one correct path through. To add further to the hazards, a player can create up to three booby traps of his or her own at a time during the game and thus can be used strategically

The game can be varied by changing the dimensions of the maze to any size up to a maximum of 13 by 15, and, when playing the computer 4 levels of difficulty are offered. Control is by joystick and since the emphasis is on thinking as much as dexterity, the speed is controlled by the user

The bleeps from two players in action sounds a bit like massed armies of mice A simple idea, but good hin nevertheless

Derrick Truease

Thrills 'n' spills

Program *Full Throttle* **Micro** Spectrum 48K **Price** £6.95 **Supplier** Micromega, 230-236 Lavender Hill, London SW11

Full Throttle is the motorbike equivalent of Psion's *Chequered Flag* A racing game, where you ride a 500cc bike around any of ten of the world's most famous tracks.

The screen display is almost identical to that of Psion's highly successful game — the road twisting and turning in front of you, with grass either side, and mountains in the distance.

Although *Chequered Flag* is recognised as the best car racing game available for the Spectrum, it does have two faults Firstly, you can't use a joystick (at least, no ordinary joystick such as Kempston), secondly, you have to just race against yourself Micromega have taken the same idea for a game, changed it slightly (motorbikes instead of cars), and have remedied both of the faults mentioned above You can use almost any joystick (be warned — this is the most likely game recently released to cause you to break your joystick — you'll become so engrossed that you'll push it and pull it. then, snap, no more joystick!) And what is more, not only can you race alone, in the 'practice' mode, but you can also race against 40 other bikers

Racing against the other bikers makes for a much more addictive game No matter how I tried, I could not do better than finishing 38th out of 40 I actually reached 34th place at one stage in one of the races, but I soon dropped back again. The main reason for my bad performance, is that whenever you hit another bike you are slowed down to 0 mph, and must then accelerate again. Incidentally, acceleration on your bike is rather good — 0 to 175 mph in about 3½ seconds! The problem I had, was that I seemed unpopular — whenever I came up behind a bike and was about to overtake it, it moved, or whether I am just paranoid, I do not know But one day I'll show those other riders just what I can do

David Lester

Mnemonics

Program *Spectrosim* **Micro** Spectrum 48K **Price** £5 95 **Supplier** Shiva Software, 4 Church Lane, Nantwich, Cheshire CW5 5RQ

Assembly language allows you to enter machine-code mnemonics — the abbreviated instructions to the processor at the heart of the computer — and have them automatically converted into the correct numerical form.

One difficulty of learning Spectrum assembly language is the complexity of the Z80 instruction set, which needs to deal with some twenty registers and eight flags, and the problem that a crash is usually fatal to the program itself.

Spectrosim gives the beginner a chance to learn about assembly programming on an imaginary microprocessor, which has just four registers and three flags and which takes errors in its stride

The imaginary instruction set includes only the *Load, Arithmetical, Logical, Comparative Jump* and *Halt* groups, but nevertheless allows a beginner to make the first steps of machine-code programming The clear screen display and fairly comprehensive manual, together with the use of decimal values in all registers, and the ability to display output in binary form make it easy to see just what is going on as you run, or single-step your program.

Reasonably priced and well presented, this is a good buy for the serious computer user who wants to learn more, but finds the idea of leaping straight into Z80 machine-code a little daunting

Simon Springett

Serious study

Program *Microdrive Utility* **Micro** Spectrum 48K **Price** £4 50 **Supplier** Easyuse Software, 67 Arlott Crescent, Oldbrook, Milton Keynes, Bucks MK6 2RA.

One of the gripes about Microdrives is the lack of information given by the Basic command *Cat n* which simply displays the cartridge name, a list of the non-protected file names and the remaining available space on the cartridge The file types are not listed, nor an indication of any faults that might exist.

The *Microdrive Utility Program* (or *MUP*) from Easyuse Software fills that information gap, with a good range of diagnostic tools to investigate a cartridge After loading the tape (which you can back up to microdrive cartridge) you are given a menu of options, including some related to the physical state of the cartridge — such as a sector distribution map — and some related to the individual files — you can see the length and position of each program on the tape, for example, or investigate each sector involved, seeing checksums and the initial information on each sector. A *Copy* facility would have been useful to keep a record of useful information. The program assumes a fair knowledge of the microdrive's data structure, but there are plenty of books available to give that information.

MUP is useful, cheap and, being entirely in machine-code, fast. Wall worth £4 50 for anyone with serious uses for their microdrive

Simon Springett

Gamble or collect

Program *Jackpot* **Price** £4.95 **Micro** Spectrum **Supplier** Michael Horgan.

Although there are quite a number of fruit machine simulations on sale for the Spectrum, I have not seen any of them.

So I looked forward to this game to see how the age-old 'arcade' (the old type) game had coped with its transition to a computer.

I cannot honestly say that it has retained any of its addictive qualities. The original was enjoyable — you could see the wheels spinning and this somehow added to the fascination. This version, though, does not show any such moving graphics, even though it would be a marvellous opportunity to exploit the programmer's talent for high quality graphics — the program certainly needs *something* to add a bit of life to it. Instead, when you press the S key to start your go, you hear (if you have good hearing) three miserable beeps, and the new fruit, bar, or whatever, appears on the screen. The Spectrum is not the world's noisiest computer, but a game like this really needs better sound effects which are well within reach from either Basic or machine-code.

If you occasionally play a real fruit machine and want to continue the same excitement in the comfort of your own home without losing pocket-fruits of 10p's you should *not* buy this game. If you happen to be uncontrollably addicted to the real thing, then this program is likely to provide cure. I have not been so bored since *Mugsy* and *The Fall of Rome* — the two most overrated games to have been released for ages — came on sale.

David Lester

Flashing dots

Program *Admiral Graf Spee* **Micro** Amstrad CPC 464 **Price** £7.95 **Supplier** Amsoft, Brentwood House, 169 Kings Road, Brentwood, Essex.

Set in the South Atlantic during World War Two, you are Captain Langsdorff at the helm of the German pocket battleship Graf Spee with the objective of seeking out and destroying enemy British ships.

This is quite a good basis for a game but the implementation leaves a lot to be desired. For example searching for enemy ships is simply a matter of moving the Graf Spee around the screen, using either keypad or a joystick towards intermittently flashing dots whilst trying to conserve fuel.

Compared to this boring search, the battles are quite exciting. The Graf Spee must be manoeuvred within range and sight of the target before it can be engaged with guns and torpedos. The targets are able to return fire, with great effectiveness.

Problems are the unresponsive controls, a 'Hold' key that fails to work or else destroys the program and generally sluggish action.

Greg Pearson

Challenging

Progam *Harrier Attack* **Micro** Commodore 64 **Price** £6.95 **Supplier** Durrell Software, Castle Lodge, Castle Green, Taunton, Somerset.

The name of the game tells you what it's all about. You have to pilot your Harrier jump-jet from its base on board an aircraft carrier on a mission to destroy the enemy base.

As you fly over enemy territory you are constantly attacked by hostile aircraft, rockets and ground-to-air missiles. You only have a limited supply of rockets and bombs with which to defend yourself, so you have to be careful to leave sufficient for your assault on your target. Fuel must also be conserved by flying at an economical speed, and avoiding too much manoeuvring. If you reach the base and destroy it, you must then return to the carrier flying back the way you came.

The graphics and sound are straightforward but effective. The manoeuvrability of the Harrier is nicely reproduced — you can control motion in vertical and horizontal directions, accelerate, decelerate and fly backwards. In order to control all these functions, plus firing rockets and dropping bombs, you need to be able to operate no fewer than seven keys. However they are sensibly laid out and fall readily under the fingertips. Quite challenging.

Richard Cerfield

Fifteen-two

Program *Crib* **Micro** Spectrum 48K **Price** £5.95 **Supplier** Mutch of Farm Cottage, 28 The Street, Barton Mills, Bury St Edmunds, Suffolk.

Card games don't always transfer very well to a computer but the Farm Cottage version of *Cribbage* is an exception well worth considering if you would like a game and don't have a partner to join you.

The program is an accurate implementation of the original, though plays only the two-player version, with the computer taking the part of one of the players. You play twice round the board, and the human player is given the first crib, or extra hand (though experienced players will know that this may not help especially who has the crib may be more important at the end of the game.

Crib blends Basic and machine-code, and uses colour and sound well. You are always able to study the game before deciding on your move. All entry is by single key-press and prompts make the game easy to play. My one criticism was that during the pegging section the running total was not displayed, nor prompts of suitable values to get 31 given (such as "26 five's a fix" and "30 one for two"), but don't let this put you off buying.

Simon Springett



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An obvious answer

SuperBasic has many of the powerful features of Pascal including recursive techniques **Alan Turnbull takes a look**

One of the most interesting and useful features of the QL for me is its structured programming

I have been used to programming in Pascal for several years, but now I can get most same features in QL SuperBasic — although the data structuring facilities of Pascal are not available on the QL.

As well as structured loops, the programmer can construct procedures and functions, totally transparent in purpose to the user — just as in Pascal, and use them as if they were part of the SuperBasic language

A special class of procedures and functions — referred to as 'recursive' — are of particular interest to programmers. A recursive object is one which is defined partially in terms of itself. Recursion is *not* the same as one of those 'circular' arguments you start in the pub when you have had one too many! In describing an object recursively, we begin by describing a simple case directly Solutions to others more complicated are then found in terms of the solution to the simple case

Unfortunately, early programmers, especially Cobol programmers in the 1960's, looked upon recursion as an ivory tower plaything and ignored it. But recursion, if used wisely, can give the most obvious solution to a complex problem.

Consider the mathematical definition of a factorial. The factorial of *n* written as *n!*, is defined as the product of all integers from *n* down to 1. For example 6! = 6×5×4×3×2×1 There is also a special, so-called 'base case', 0! = 1, which is defined to be true.

From this a recursive definition of factorial can be formed. Factorial(0) = 1 and factorial(n) = n×factorial(*n*-1) A SuperBasic function can be written directly from this definition — it is shown in Fig 1 Note that the SuperBasic definition looks just like the mathematical definition.

```
100 REMark Factorial function for
    the Sinclair QL
110 REMark  July 1984   Alan
                        Turnbull
120
130 DEFine FuNction FACTORIAL(n)
140   IF n=0 THEN
150     RETurn 1
160   ELSE
170     RETurn n*FACTORIAL(n-1)
180 END DEFine FACTORIAL
```

Fig 1

From this start with an easy and well-known example, one can progress quite a long way Strictly for the mathematicians among you a function exists called Ackermann's Function which is used mostly to illustrate recursion to students! It may be summarised as follows.

ack(0,n) = n+1
ack(m,0) = ack(m−1,1)
ack(m,n) = ack(m−1 ack(m,n−1))
for m,n >= 0

Fig. 2 shows a SuperBasic listing to implement this function Just try to implement it in Basic on the ZX Spectrum! Indeed, the only way to do it would be to explicitly use a stack and even then, problems of variable clashes would arise.

```
100 REMark Ackermann's Function
         for the Sinclair QL
110 REMark        1984  Alan Turnbull
120
130 DEFine FuNction ACK(m,n)
140   IF m=0 THEN
150     RETurn n+1
160   ELSE
170   IF n<>0 AND m=0 THEN
180     RETurn ACK(m-1 1)
190   ELSE
200     RETurn ACK(m-1,ACK(m n-1))
210   END IF
220 END DEFine ACK
```

Fig 2

Onto procedures and Fig 3 shows a SuperBasic procedure to sort a numerical array So what? you may say Well, this sorting algorithm is different from the ones you will be used to For a start, it is not the good old 'bubble sort', which is thrashed out in many articles and secondary school computer studies courses

```
100 REMark QUICKSORT algorithm for
    the Sinclair QL
110 REMark  July 1984, Alan Turnbull
120
130 DEFine PROCedure QUICKSORT
    (array,left,right)
140 LOCal i j median,temp
150 IF left<right THEN
160   LET i=left LET j=right
170   LET median=array((left+right)
      DIV 2)
180   REPeat main_loop
190     REPeat expand_s1
200       IF array(i)>=median THEN
        EXIT expand_s1
210       LET i=i+1
220     END REPeat expand_s1
230     REPeat expand_s3
240       IF array(j)<=median THEN
          EXIT expand_s3
250       LET j=j-1
260     END REPeat expand_s3
270     IF i<=j THEN
280       LET temp=array(i)
290       LET array(i)=array(j)
300       LET array(j)=temp
310       LET i=i+1
320       LET j=j-1
330     END IF
340     IF i>j THEN EXIT main_loop
350   END REPeat main_loop
360   IF left<j THEN QUICKSORT
      array left j
370   IF i<right THEN QUICKSORT
      array i right
380 END IF
390 END DEFine QUICKSORT
```

Fig 3

It is 'Quicksort', developed way back in 1962 by Professor Tony Hoare at Oxford University Why have you not heard much about it, then? The answer lies in the fact that a good many Basic dialects cannot support the concept of recursive procedures and functions, and local variables BBC Basic can, and so too can Sinclair QL SuperBasic. So the six month wait was worth it, after all!

The algorithm may be summarised in English as follows

PROCEDURE quicksort(s)
BEGIN
 IF *s* contains more than one element THEN
  BEGIN
   choose the median element *x* from *s*,
   partition *s* into sequences *s1*, *s2* and *s3*
   with elements
    less than or equal to *x*, equal to *x* and
    greater than or equal to *x*;
   quicksort(s1);
   quicksort(s3)
 END
 END

To call the procedure you should state its name in a SuperBasic statement with three parameters: the array you wish to sort, the lower bound of the array and the upper bound. A typical call to sort an array dimensioned as DIMension array_1(100) would be quicksort array_1,1,100

In Fig 3, note that *LET* statements are used throughout. SuperBasic defines the keyword *LET* to be optional but I have left it in to aid clarity The Pascal *Repeat/Until* and *While*/DO loops are both replaced in SuperBasic by the *REPeat/Exit/END REPeat* construct.

It is easy to see that the *While* and *Repeat* constructs in Pascal, and the *REPeat* construct in SuperBasic compare in the following manner

WHILE(condition)DO	REPeat (loopname)
BEGIN	IF NOT (condition)
	THEN EXIT (loopname)
statements	statements
END;	END REPeat (loopname)
REPEAT	REPeat (loopname)
statements	statements
UNTIL (condition);	IF (condition) THEN
	EXIT (loopname)
	END REPeat (loopname)

Note that the *Quicksort* algorithm is very fast (subject of course, to the speed of the system it runs on) and that it may be used as a direct command or as a program statement This could perhaps, be a procedure you may wish to place in a file called *Boot*, on MDV_1, so that upon the QL bootstrapping, it loads the procedure into memory ready to be used. This way, one could develop a QL turn-key system!

I hope this article proves to be a good introduction for readers to the concept of recursion in programming.

Character forming

*Create any characters of your choice with **Mark Gornall's** character generator program*

The program lets you create a character of your choice but it is quicker, easier and simpler than using pen and paper as it would normally have done. You control a cursor on an eight by eight grid and plotting points on the grid forms the character.

When you have finished using the grid the space bar is pushed, the program then displays your newly formed character and the data that created it. If you are not happy with the character, just go back to the grid and try again. Once you set the character you want you can write down the data and use it in your own programs! If you do not fully understand programmable characters then I suggest you read the Programmer's Reference Guide, pages 107 to 114.

When you have created a character on the grid you should position the grid's cursor over a plotted point before pressing the space bar, this is just so the computer won't count the cursor as a plotted point.

There is an automatic erase built into the cursor so when you plot a point and move back across it you will erase it. When the cursor is on top of a plotted point that you want to keep just press the key to plot before you move again.

The advantages of using the program are that you can make many more characters than the ones found on the keyboards, these may range from digital lettering to roman numerals.

The character set is moved from Rom to Ram at the beginning of the program because the characters can only be changed once they are in the Ram, as the Rom characters always stay the same.

Keys
D–Moves cursor left
A–Moves cursor right
W–Moves cursor up
X–Moves cursor down
S–Plots a point on the grid
Z–Clears the whole grid

Abreviations
[CLR]–Shift clr/home
[CBM4]–Commodore key and 4
[CUR]–Cursor right
[CUd]–Cursor down

Program notes

50–60	Set up screen
70–130	Move character set
135	Set variables
140–280	Set up screen
290–350	Check key pressed
370–400	Calculate data
420	Create new character
455–580	Print character and data
5000–5040	Draw grid
6000–6060	Check move

```
1 REM *** P.C.G. - MARK G,1984 ***
50 POKE53280,12:PRINT"[CLR][CBM4]
   THE CHARACTER
   SET IS BEING TRANSFERED"
60 POKE53281,12:PRINT"FROM ROM TO RAM,
   PLEASE WAIT."
70 POKE56334,PEEK(56334)AND254:POKE1,
   PEEK(1)AND251
80 FORI=0TO128:FORJ=0TO7
100 POKE12288+I*8+J,PEEK(53248+I*8+J)
110 NEXTJ:NEXTI
120 POKE1,PEEK(1)OR4:POKE56334,PEEK(56334)OR1
130 POKE53272,(PEEK(53272)AND240)+12
135 S=1024:C=55296:X=7:Y=5:P=43
140 PRINT"[CLR][CUR][CUR][CUR]PROGRAMMABLE
    CHARACTER GENERATOR"
150 PRINTTAB(3)"DDDDDDDDDDDDDDDDDDDDDDDDDDDDD
    DDD":REM *** 32 SHIFTED D'S ***
190 GOSUB 5000
200 PRINTTAB(20)"[CUD][CUD][CUD][CUD][
    CBM4]D-LEFT"
210 PRINTTAB(20)"A-RIGHT"
220 PRINTTAB(20)"W-UP"
230 PRINTTAB(20)"X-DOWN"
240 PRINTTAB(20)"S-PLOT"
250 PRINTTAB(20)"Z-CLEAN"
260 FORI=1TO5:PRINT"[CUD]":NEXTI
270 PRINTTAB(4)"PRESS SPACE BAR WHEN FINISHED"
280 POKES+X+40*Y,160:POKEC+X+40*Y,0
290 GETI$:IFI$=""THEN290
300 IFI$="D"THEN GOSUB 6000
310 IFI$="A"THEN GOSUB 6000
320 IFI$="X"THEN GOSUB 6000
325 IFI$="W"THEN GOSUB 6000
330 IFI$="S"THEN P=160
340 IFI$="Z"THEN GOSUB 5000:GOTO280
350 IFI$<>" "THEN290
369 REM *** CALCULATE DATA ***
370 FORI=0TO7:FORJ=0TO7
390 IF PEEK(1238-J+40*I)=160THENA(I)=A(I)+2↑J
400 NEXTJ:NEXTI
419 REM *** CREATE NEW CHARACTER ***
420 FORI=0TO7:POKE12512+I,A(I):NEXTI
455 PRINT"[CLR]YOUR NEW CHARACTER:"
460 FORI=0TO16
470 POKES+120+2*I,28:POKEC+120+2*I,I
480 NEXTI
490 PRINT"[CUD][CUD][CUD][CUD][CUD][CUD]
    [CUD]DATA:[CUD]"
500 FORI=0TO7
510 PRINTA(I);
520 IFI<>7THENPRINT",";
530 NEXTI
540 FORI=0TO5:PRINT"[CUD]":NEXTI
550 PRINTTAB(5)"CREATE ANOTHER
    CHARACTER? (Y/N)"
560 GETI$:IFI$=""THEN560
570 IFI$="N"THENEND
580 IFI$<>"Y"THEN560
590 CLR:GOTO135
4999 REM *** DRAW GRID ***
5000 FORI=7TO14:FORJ=5TO12
5020 POKES+I+40*J,43:POKEC+I+40*J,0
5030 NEXTJ:NEXTI
5040 RETURN
5999 REM *** CHECK MOVE ***
6000 POKES+X+40*Y,P:POKEC+X+40*Y,0
6010 IFI$="D"THENX=X+1:IFX>=14THENX=14
6020 IFI$="A"THENX=X-1:IFX<=7THENX=7
6030 IFI$="X"THENY=Y+1:IFY>=12THENY=12
6040 IFI$="W"THENY=Y-1:IFY<=5THENY=5
6050 P=43:POKES+X+40*Y,160:POKEC+X+40*Y,0
6060 RETURN
READY.
```

Catalogue of errors

Alan Mcdonald explains the error table in Part 3 of his adventure series

This week we shall be doing the following

1) Expanding the error table
2) Dealing with movement, eg, *Go North* and
3) Taking a look at how the *Get*, *Drop* and inventory routines work.

The Error Table

If you examine this week's assembler listing, you should see a section headed the Error Table. In fact it isn't an error table, but instead a quick way of printing messages, such as 'Ok' or 'I don't understand'. Messages are printed to the screen.

```
LD B message no.
CALL PRINT
JP INPUT
```

As you can see, using the above format is not always desirable. Obviously the message 'Ok' is used a great deal in adventures and to keep on using the above format for printing messages uses up a great deal of unnecessary memory. The following is much easier

```
JP OUT   CALL PRINT   call the print routine
         JP INPUT     jump to the input routine.
```

Movement

Movement is very easy to control. We used six variables to store the directions which can be moved to from the player's current location, ie NOR, SOU, EAS, WES, UP, DOW. Remember 0 = 'You can't go in that direction.' As an example, say the player wanted to move North:

1) Test the value held in the variable NOR
2) If it's 0 then print 'You can't go in that direction.

else
3) put the value in NOR into X
4) Jump to the PLOC routine. (Print location.)

In machine code that's:

```
G.NOR    LD A,(NOR)    A holds the value in NOR.
         CP 0          ,is it 0?
         JP Z,ERR.4    if yes print 'You can't go in
                       that direction.
         LD HL,NOR     HL points to NOR
         LD A,(HL)     ,now A holds its value.
         LD (X),A      put it into X
```

Get and Drop

Take a look at this week's assembly listing and you should see two tables called get and drop. You should however ignore these as they deal with the get and drop all routines.

Imagine the player typed *Get Cage*. Once the computer has found the word *Get* it calls the *Get*t subroutine. Once the *Gett* routine is entered, checks need to be taken to see what object the player wants to take or drop. The routine to do this is called *Test2*, each object is tested in turn. The *Test2* routine also checks for 'ALL'.

Once an object has been identified, the C register is given a value which corresponds to the object. Take a look at the first part of the series; remember the keys are object 1. Therefore if we entered *Get Keys*, the computer would load the C register with 1. However, sometimes two objects are used to represent only one object, eg:

A TORCH WHICH IS OFF
and A TORCH WHICH IS ON

Remember that only one object can exist at any one time. Therefore, if the existence of one of the torches is 3 (does not exist) then C is loaded with the object number of the other torch, ie

```
         T2 DEFM "TORC"
NEXT2    LD HL,T2       is it the torch?
         CALL FIVE
         JP NZ,NEXT3    if no check next object.
         LD HL,EXE+1    the torch which is on.
                        (object 2)
         LD A,3
         CP (HL)        does it exist.
         JR Z,O TOR     if no then it must be the
                        other torch
         LD C,2         C = the torch which is on.
         JP FINISH      ,exit test routine.
O.TOR    LD C,3         C = the torch which is off.
         JP FINISH      ,exit the routine.
```

We now know the object's number (it's held in the C register). Before it can be picked up, several questions need to be answered,

1) Is it at the same location as the player ?
2) Can it be picked up, ie, is its existence 0
3) Can the player carry any more objects?

This is done by checking the variable INV, if its value is greater than four, then no more objects can be carried. You can change this to any value you require. Note: you will need to change the CP 4 in the GET (get all) routine as well. The get all routine simply works by testing all of the objects in turn. Also note the routine labled *DISS*, simply prints the object to the screen, ie YOU TAKE

The torch which is off.

The variables NT and ROU are used by the *DISS* routine.

The Inventory Routine

The inventory routine simply checks to see if you are carrying an object. If you are, then it's printed to the screen. This can easily be done by testing the existence of each object, ie, seeing if it's 1.

However, you should note that the inventory routine which I have written also checks to see if you are wearing an object, ie, if the existence is 4. If you are going to use this facility in your own adventure then you must change the value into line 8080.

If message 10 in your program is—(which you are wearing) Then change the line into LD B, 10

Note the inventory routine first checks to see if you are carrying anything with you. If you are not then the computer will display:

You are carrying nothing with you.

Note: As with all the routines which deal with the objects, you will need to tell the computer how many objects your adventure has, ie, change all the 14's to what ever value you have, and all of the 15's to the value you have +1.

Next week sees the final part in this series of adventure writing

```
; Error table:
; The appropriate
; errormessage
; is printed.
;
;
;
ERR_1   LD    B,1
        JP    JP_OUT
ERR_2   LD    B,2
        JP    JP_OUT
ERR_3   LD    B,6
        JP    JP_OUT
ERR_4   LD    B,7
        JP    JP_OUT
ERR_5   LD    B,8
        JP    JP_OUT
ERR_6   LD    B,9
        JP    JP_OUT
ERR_7   LD    B,18
        JP    JP_OUT
ERR_8   LD    B,19
        JP    JP_OUT
ERR_9   LD    B,20
        JP    JP_OUT
ERR_10  LD    B,21
        JP    JP_OUT
ERR_11  LD    B,24
        JP    JP_OUT
ERR_12  LD    B,25
        JP    JP_OUT
ERR_13  LD    B,26
        JP    JP_OUT
ERR_14  LD    B,27
        JP    JP_OUT
ERR_15  LD    B,28
        JP    JP_OUT
ERR_16  LD    B,29
        JP    JP_OUT
;
;
; This routine does
; theequivilent of:
; CALL PRINT
; JP INPUT.
;
;
JP_OUT  CALL  PRINT
        JP    INPUT
;
;
; The Movement
; routines:
; Controls movement
; of player.
; e.g GO NORTH.
;
G_NOR   LD    HL,NOR
        JR    DOIT
G_SOU   LD    HL,SOU
        JR    DOIT
G_EAS   LD    HL,EAS
        JR    DOIT
G_WES   LD    HL,WES
        JR    DOIT
G_UP    LD    HL,UP
        JR    DOIT
G_DOW   LD    HL,DOW
        JR    DOIT
DOIT    XOR   A
        CP    (HL)
        JP    Z,ERR_4
        LD    A,(HL)
        LD    (X),A
        JP    PLOC
;
;
; Get routine.
```

continued over the page

```
5410 ;This routine is
5420 ;called
5430 ;by 'get all'.
5440 ;The main routine is
5450 ;entered at GETIT.
5460 ;
5470 GET     XOR  A
5480         LD   (AT),A
5490         LD   (ROU),A
5500         LD   HL,LOC
5510         LD   DE,EXE
5520         LD   B,0
5530 LOOP_B  LD   A,(INV)
5540         CP   4
5550         JP   NC,ERR_7
5560         LD   A,(DE)
5570         CP   A
5580         JR   Z,PASS
5590 BACK_1  INC  HL
5600         INC  DE
5610         LD   A,B
5620         INC  B
5630         CP   14
5640         JR   NZ,LOOP_B
5650         JP   INPUT
5660 PASS    LD   A,(X)
5670         CP   (HL)
5680         JR   Z,ADD_IT
5690         JR   BACK_1
5700 ADD_IT  CALL DISS
5710         LD   A,1
5720         LD   (DE),A
5730         LD   A,(INV)
5740         INC  A
5750         LD   (INV),A
5760         JR   LOOP_B
5770 ;
5780 ;
5790 ;  Drop routine.
5800 ;
5810 ;  Ditto for GET.
5820 ;
5830 ;
5840 DROP    XOR  A
5850         LD   (AT),A
5860         LD   A,1
5870         LD   (ROU),A
5880         LD   HL,LOC
5890         LD   DE,EXE
5900         LD   B,0
5910 LOOP_C  LD   A,(DE)
5920         CP   1
5930         JR   Z,CHAN
5940 BACK_2  INC  HL
5950         INC  DE
5960         LD   A,B
5970         INC  B
5980         CP   14
5990         JR   NZ,LOOP_C
6000         JP   INPUT
6010 CHAN    CALL DISS
6020         XOR  A
6030         LD   (DE),A
6040         LD   A,(X)
6050         LD   (HL),A
6060         LD   A,(INV)
6070         DEC  A
6080         LD   (INV),A
6090         LD   A,(INV)
6100         CP   0
6110         JP   Z,INPUT
6120         JR   BACK_2
6130 TEST2   LD   C,0
6140         LD   HL,Z10
6150         CALL FOUR
6160         JP   NZ,NEXT1
6170         LD   C,255
6180         JP   FINISH
6190 NEXT1   LD   HL,T1
6200         CALL FIVE
6210         JP   NZ,NEXT2
6220         LD   C,1
6230         JP   FINISH
6240 NEXT2   LD   HL,T2
6250         CALL FIVE
6260         JP   NZ,NEXT3
6270         LD   HL,EXE+1
6280         LD   A,3
6290         CP   (HL)
6300         JR   Z,D_TOR
6310         LD   C,2
6320         JP   FINISH
6330 D_TOR   LD   C,3
6340         JP   FINISH
6350 NEXT3   LD   HL,T3
6360         CALL FIVE
6370         JP   NZ,NEXT4
6380         LD   HL,EXE+3
6390         LD   A,3
6400         CP   (HL)
6410         JR   Z,D_BOT
6420         LD   C,4
6430         JP   FINISH
6440 D_BOT   LD   C,5
6450         JP   FINISH
6460 NEXT4   LD   HL,T4
6470         CALL FIVE
6480         JP   NZ,NEXT5
6490         LD   HL,EXE+8
6500         LD   A,3
6510         CP   (HL)
6520         JR   Z,D_CAGE
6530         LD   C,9
6540         JP   FINISH
6550 D_CAGE  LD   C,12
6560         JP   FINISH
6570 NEXT5   LD   HL,T5
6580         CALL FOUR
6590         JP   NZ,NEXT6
6600         LD   C,10
6610         JP   FINISH
6620 NEXT6   LD   HL,T6
6630         CALL FIVE
6640         JP   NZ,FINISH
6650         LD   C,14
6660 FINISH  LD   A,C
6670         CP   0
6680         RET
6690 ;
6700 ;
6710 ;  The Get routine is
6720 ;  entered from here.
6730 ;
6740 ;
6750 GETIT   CALL TEST2
6760         JP   Z,ERR_5
6770         CP   255
6780         JP   Z,GET
6790         LD   A,(INV)
6800         CP   4
6810         JP   NC,ERR_7
6820         LD   HL,LOC-1
6830         LD   B,0
6840         ADD  HL,BC
6850         LD   A,(X)
6860         CP   (HL)
6870         JP   NZ,ERR_5
6880         LD   HL,EXE-1
6890         ADD  HL,BC
6900         LD   A,(HL)
6910         CP   0
6920         JP   NZ,ERR_5
6930         LD   A,1
6940         LD   (HL),A
6950         LD   A,(INV)
6960         INC  A
6970         LD   (INV),A
6980         LD   B,C
6990         DEC  B
7000         XOR  A
7010         LD   (AT),A
7020         LD   (ROU),A
7030         CALL DISS
7040         JP   INPUT
7050 ;
7060 ;
7070 ;  The Drop routine is
7080 ;  entered from here.
7090 ;
7100 ;
7110 DROPIT  LD   A,(INV)
7120         CP   0
7130         JP   C,INPUT
7140         CP   0
7150         JP   Z,INPUT
7160         CALL TEST2
7170         JP   Z,ERR_6
7180         CP   255
7190         JP   Z,DROP
7200         LD   HL,EXE-1
7210         LD   B,0
7220         ADD  HL,BC
7230         LD   A,(HL)
7240         CP   1
7250         JP   NZ,ERR_6
7260         XOR  A
7270         LD   (HL),A
7280         LD   HL,LOC-1
7290         ADD  HL,BC
7300         LD   A,(X)
7310         LD   (HL),A
7320         LD   A,(INV)
7330         DEC  A
7340         LD   (INV),A
7350         LD   B,C
7360         DEC  B
7370         XOR  A
7380         LD   (AT),A
7390         LD   A,1
7400         LD   (ROU),A
7410         CALL DISS
7420         JP   INPUT
7430 ;
7440 ;
7450 ;  Table of objects:
7460 ;
7470 ;
7480 T1          DEFM " KEYS"
7490 T2          DEFM " TORC"
7500 T3          DEFM " BOTT"
7510 T4          DEFM " CAGE"
7520 T5          DEFM " ROD"
7530 T6          DEFM " SHAK"
7540 ;
7550 ;
7560 ;  Table of words:
7570 ;
7580 ;
7590 D1          DEFM " GOAT"
7600 D2          DEFM " BIRD"
7610 ;
7620 ;
7630 ;  The Inventory
       routine:
7640 ;
7650 ;
7660 INVENT  LD   DE,EXE
7670         LD   B,14
7680 LOOPF   LD   A,(DE)
7690         CP   1
7700         JR   Z,MATC2
7710         CP   4
7720         JR   Z,MATC2
7730         INC  DE
7740         DJNZ LOOPF
7750 EMES    LD   B,14
7760         JP   JP_OUT
7770 MATC2   LD   B,15
7780         CALL PRINT
7790         LD   B,1
7800         LD   DE,EXE
7810 BACK2   LD   A,(DE)
7820         CP   1
7830         CALL Z,P_ITT
7840         CP   4
7850         CALL Z,P_ITT
7860         INC  B
7870         INC  DE
7880         LD   A,B
7890         CP   15
7900         JR   NZ,
                  BACK2
7910         LD   B,16
7920         JP   JP_OUT
7930 P_ITT   CALL PRIN
7940         LD   A,(DE)
7950         CP   4
7960         RET  NZ
7970         PUSH BC
7980         PUSH DE
7990         PUSH HL
8000         LD   B,43
8010         CALL PRINT
8020         POP  HL
8030         POP  DE
8040         POP  BC
8050         RET
8730 ; This routine
8740 ; is common
8750 ; to both Get
8770 ; and Drop.
8780 ;
8790 DISS    PUSH BC
8800         PUSH DE
8810         PUSH HL
8820         PUSH AF
8830         LD   A,(AT)
8840         CP   0
8850         JR   NZ,JPIT
8860         LD   B,1
8870         LD   (AT),A
8880         LD   A,(ROU)
8890         CP   0
8900         JR   NZ,DDI
8910         PUSH BC
8920         LD   B,17
8930         CALL PRINT
8940         POP  BC
8950         JR   JPIT
8960 DDI     PUSH BC
8970         LD   B,18
8980         CALL PRINT
8990         POP  BC
9000 JPIT    INC  B
9010         LD   HL,
                  OBJECT
9020         CALL IN_
9030         POP  AF
9040         POP  HL
9050         POP  DE
9060         POP  BC
9070         RET
```

Buildings in motion

***Jason Orbaum and Geoffrey Campbell** continue their series on assembly programming*

This week all is revealed about "scroll buildings" routine. The first eight lines (up to the line before *FPAST*) find the distance of the plane from the ground, as it would hardly be fair to scroll the buildings to above the plane (quite interesting to play though!). The result is placed in *Line*, and is used to load the X and Y registers at *FPAST*.

This is done by loading them with the addresses for the top and second-top rows respectively, and then taking 32 from them for the number of times held in the A register.

The last part of the routine is a fairly standard block-copy, where the original address is held in the X register, and the target address is held in the Y register.

SUBROUTINES

The first of these (*PAUSE*) generates a random pause the length of which is dependant on the contents of the timer (stored at $1§13). It is used to allow the contents of the timer to change between buildings, so that they are of different heights. Without this pause, all the buildings are the same height.

The next routine (*BANG*) generates the sound when the buildings are put up, and also when the plane crashes. Dragon sound will be covered in two weeks time, with a routine to give a sound of any pitch and duration.

INV is a routine to invert the contents of the screen, when the plane crashes. This will change any block to one of a different character, except the black blocks, which are compensated for by replacing them with a green space. This is, in turn, compensated by the next routine, *GREEN*, which replaces all green blocks with black ones. This, unfortunately, loses all the green buildings on the screen, but this does not matter much as it is at the end of the game.

HUMM is more sound, which produces the background noise.

NOPRES is only executed when there is no bomb dropping, and was covered last week.

At the end of each wave, control is passed to *FIN* which prints up the score (in another subroutine), pauses and makes a sound by calling *ZAP* 40 times. It changes the delay variable in *WAVE*, and then starts again from *BEGIN*.

ZAP is another sound routine, and *SCR* prints up the score. This is done in a fairly devious way. First of all, six zeroes are printed on the screen, and then, using a counter held in score, the first digit is incremented that number of times. Each time it is incremented the character is compared with the colon (first character after the nine) to check for an overflow. If an overflow has occurred, then the program moves on to the next digit, and does the same.

The only drawback with this method is that it will move past the sixth digit and onto the screen display proper (but we have yet

```
20C0                 *
20C0                 * SUBROUTINES
20C0                 *
20C1 3420     PAUSE  PSHS   Y
20C3 10BEA112        LDY    $112
20C7 31A3EC   DELAY  LEAY   -20 Y
20C9 26FE            BNE    DELAY
20CB 3520            PULS   Y
20CD 39              RTS
20CE                 *
20CE                 *
20CE 3412     BANG   PSHS   A X
20D0 B6FF23          LDA    65315
20D3 8A08            ORA    #8
20D5 B7FF23          STA    65315
20D8 7F0147          CLR    327
20DB 8E8798          LDX    #47000
20DE A680     GLOOP  LDA    X+
20E0 8D0F            BSR    SOUND
20E2 A680            LDA    X+
20E4 8D0B            BSR    SOUND
20E6 7A0147          DEC    327
20E9 26F3            BNE    GLOOP
20EB B6FF23          LDA    65315
20EE 3512            PULS   A.X
20F0 39              RTS
20F1 B40147   SOUND  ANDA   327
20F4 B7FF20          STA    65312
20F7 8641            LDA    #65
20F9 4A       GDEL   DECA
20FA 26FD            BNE    GDEL
20FC 39              RTS
20FD                 *
20FD                 *
20FD 3412     INV    PSHS   X.A
20FF 8E0400          LDX    #1024
2102 A684     GBEG   LDA    X
2104 8180            CMPA   #128
2106 2602            BNE    GFAST
2108 868F            LDA    #143
210A 8840     GFAST  EORA   #64
210C A780            STA    X+
210E 8C0E00          CMPX   #$E00
2111 25EF            BLO    GBEG
2113 3522            PULS   Y.A
2115 39              RTS
211F                 *
2116                 *
2116 8E0400   GREEN  LDX    #$400
2119 A684     GRLOOP LDA    X
211B 818F            CMPA   #143
211D 2602            BNE    GRPAST
211F 8680            LDA    #128
2121 A780     GRPAST STA    X+
2123 8C0600          CMPX   #$600
2126 25F1            BLO    GRLOOP
2128 39              RTS
2129                 *
2129                 *
2129 3432     HUMM   PSHS   A X.Y
212B B6FF23          LDA    65315
212E 8A08            ORA    #8
2130 B7FF23          STA    65315
2133 B6FF03          LDA    65283
2136 84FE            ANDA   #254
2138 B7FF03          STA    65283
213B 8E0003          LDX    #3
213E 86FD     HMLOOP LDA    #253
2140 B7FF20          STA    65312
2143 8D1C            BSR    HMDEL
2145 7FFF20          CLR    65312
2148 8D17            BSR    HMDEL
214A 301F            LEAX   -1 X
214C 26F0            BNE    HMLOOP
214E B6FF03          LDA    65283
2151 8A01            ORA    #1
2153 B7FF03          STA    65283
2156 B6FF23          LDA    65315
2159 84F7            ANDA   #247
215B B7FF23          STA    65315
```

to see anyone get over 3000!) This routine also calls *ZAP*, which slows down the routine slightly, but it is still fairly fast

This last routine can be changed to handle on screen scoring while a game is running simply by incrementing it one at a time, rather than using a counter; and without the sound as is demonstrated later in the series

Lets look at the general structure of the program itself and the way it has been presented. The program starts with copyright declaration (which anyone may put on a program that is their own work) and a date. The date is especially useful when looking abck to the program, and for filing of the various listings.

The 'V2 0' means second version, no amendments made. This is because the first version was lost in a massive crash and the program aad to be re-typed from the listing

The constants are defined at the beginning of the program and the program contains a liberal amount of REMS (*'s)

The program does not, though, encourage a Modular approach to programming

```
215E 3532              PULS  A,X Y
2160 39                RTS
2161 108E07D7  HMDEL   LDY   WAVE
2165 313F      HMDEL1  LEAY  -1,Y
2167 26FC              BNE   HMDEL1
2169 39                RTS
216A                   *
216A                   *
216A 108E0465  NOPRES  LDY   #$465
216E 313F      NPRDEL  LEAY  -1 Y
2170 26FC              BNE   NPRDEL
2172 16FECF            LBRA  NOKEY
2175                   *
2175                   *
2175 8D48      FIN     BSR   SCR
2177 8E0028            LDX   #40
217A 170013    FLOD    LBSR  ZAP
217D 301F              LEAX  -1,X
217F 26F9              BNE   FLOD
2181 FC07D7            LDD   WAVE
2184 830080            SUBD  #$80
2187 FD07D7            STD   WAVE
218A 7C07D9            INC   INC
218D 16FDC2            LBRA  BEGIN
2190                   *
2190                   *
2190 3432      ZAP     PSHS  A,X,Y
2192 B6FF23            LDA   65315
2195 8A08              ORA   #8
2197 B7FF23            STA   65315
219A 8E0001            LDX   #1
219D 86FD      ZPLOOP  LDA   #253
219F B7FF20            STA   65312
21A2 8D17              BSR   ZDEL
21A4 7FFF20            CLR   65312
21A7 8D12              BSR   ZDEL
21A9 3001              LEAX  1,X
21AB 8C0037            CMPX  #55
21AE 25ED              BLO   ZPLOOP
21B0 B6FF23            LDA   65315
21B3 84F7              ANDA  #247
21B5 B7FF23            STA   65315
21B8 3532              PULS  A X Y
21BA 39                RTS
21BB 1F12      ZDEL    TFR   X,Y
21BD 313F      ZDEL1   LEAY  -1,Y
21BF 26FC              BNE   ZDEL1
21C1 39                RTS
21C2                   *
21C2                   *
21C2 8630      SCR     LDA   #48
21C4 C630              LDB   #48
21C6 FD042D            STD   1069
21C9 FD042F            STD   1071
21CC FD0431            STD   1073
21CF 108E0431          LDY   #1073
21D3 BE07DB            LDX   SCORE
21D6 8C0000            CMPX  #0
21D9 2601              BNE   SLOO
21DB 39                RTS
21DC A6A4      SLOO    LDA   ,Y
21DE 4C                INCA
21DF 813A              CMPA  #58
21E1 2707              BEQ   CHANGE
21E3 A7A4              STA   Y
21E5 301F      SLLO    LEAX  -1,X
21E7 26F3              BNE   SLOO
21E9 39                RTS
21EA 8630      CHANGE  LDA   #48
21EC A7A4              STA   Y
21EE 8DA0              BSR   ZAP
21F0 313F              LEAY  -1 Y
21F2 A6A4              LDA   ,Y
21F4 4C                INCA
21F5 813A              CMPA  #58
21F7 27F1              BEQ   CHANGE
21F9 A7A4              STA   Y
21FB 108E0431          LDY   #1073
21FF 20E4              BRA   SLLO
2201
```

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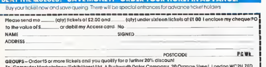
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Artistic licence

Try out your airbrush technique with Paintbox — a graphics program by Christopher Bowerman

Computer generated art is a fascinating, rewarding area for computer users to explore However, the graphics commands of the BBC micro and the ways in which they interact are far too complex to be able to readily predict the resultant effect.

Paintbox although not the most sophisticated of graphics programs, overcomes this problem by providing an environment comprehensible to the novice, yet providing more sophisticated features for those wishing to delve deeper into the system. To this end I have endeavoured to make the system as user friendly as possible, but, as I was determined that the program should run on a model A, some of the prompts do tend to be rather mnemonic

The main features are painting with either an airbrush or a paintbrush, line drawing polygons, area fill, four paint colours and *Saving* to and *Loading* from tape The main options are available via function and other keys without having to answer any prompts.

The program comes in two halves, the first of which *Chains* the second, after having set up the function keys set *Page* to a suitable level, and having instructed the user on the use of the system The second program is the main one and should be typed exactly as it is written (for model A machines) Model B users could change MODE5 to MODE1 and gain the benefits of a higher resolution.

As is often the case with computers, there can be no substitute for "hands-on" experience and the following presumes that you are trying things out as they are detailed. The *Break* key has been defined to exit the program without corrupting the program.

When the program runs the start prompt *"Set up Y/N/Q/L/S/"* appears. To set up a particular background, mode of plot, start position, brush size paint density, hit Y Pressing N makes the computer set up these values. Q will quit the program. L loads a picture from tape and S saves the current screen to tape When saving, the usual *Record*, then *Return* prompt will be displayed, but press *Return* twice so that a set of data will be recorded immediately after the picture The data saves the background colour so that alterations can be made on subsequent loadings. Hitting *Escape* at any time will return you to the start prompt

The cursor should now be flashing in the centre of the screen. It is moved by the following set of keys QWEASDZXC (Fig 1) which are arranged like the points of a compass W=up, D=right, S=paint in same area, X=down, etc Diagonals QEZC are also available Move the cursor to a suitable position. Now select a colour, function keys 0 to 3, and move the cursor; you will be in paintbrush mode. colour can be changed (Fig 2) by pressing function a key at any time.

To change from brush to airbrush hit function key 4, and move the cursor Pressing key 4 again will change back to paintbrush. To move without erasing, select the key for background colour (black or fkey 3, in this instance) and move to a new position, then select a new colour and move off again. If you make a mistake you can clear the whole screen with *Ctrl C*.

Alternatively, you could erase with the cursor First select background colour (erasing only works in background colour), then press function key 6 to turn erasing on, move the cursor over the mistake and it will be erased. Now hit fkey 6 again to turn erase off, so that you don't erase accidentally next time background colour is selected! Now choose a fresh colour and move off again.

Next line drawing Lines are drawn from the current position, in the currently selected colour — so ensure they are set as desired before hitting T R or I. Press T to trace a line. A dot will mark the start position, move the cursor to the end position and press *Return* — a line is drawn between the two points.

If you wish to draw a line from the start position of the last line drawn press R (repeat line), move to the end position and hit *Return*. Repeat line can be called ad. infinitum, and was used in drawing the sun in the sample picture.

Hitting I (increment) is useful for grid drawing, etc but first let's clear the mess we've created, by pressing control C First trace a line to the right with the T option. Now move, in background colour, a few places directly upwards, then re-select the paint colour and press I. Now tap the space bar a few times and *Return* to finish. Then hit R, to draw from the end of the last line, and move upwards to the top of the lines you just drew and press *Return* In background colour, move directly right a few places select a new paint colour and hit I Then tap the space bar a few times and a grid should be completed.

By diagonally offsetting the second point all sorts of slanting, warped grids can be produced. This was used to produce the ladder and to make the sea stripy One more thing; lines can be either dotted or solid (Acorn's descriptions not mine) To select dotted lines, press fkey 5, hitting this again will revert to solid lines.

Polygons are selected by pressing P A prompt "Fill/Wire" will appear, F will give coloured in polygons and W gives outline polygons The next prompt "sides/R" requires the number of sides and the radius of the polygon (separated by a comma) to be entered. The polygon will now be drawn in the currently selected colour at the current cursor position.

However, there are, as always, other facilities allowing polygons to be drawn in perspective" — this also provides ellipses; eg the cone and dustbin. Clear the screen again and hit fkey7, now draw a Filled polygon, with 20 sides and a radius of 100 An ellipse is drawn ie, a circle in "perspective" Pressing fkey7 made the polygon routine take note of the height width ratio set by fkey 8.

Normally horizontal polygons will be drawn, but if fkey 8 is pressed and you again key in the information for a filled, 20 sided polygon, hen vertical ellipses result. If key7 is hit again, the polygon routine will ignore the horizontal/vertical setting of fkey8 and normal, full view polygons are drawn.

To change the size of the brush, press L (levels) and the prompt "area, density" appears Two numbers separated by a comma should be entered. Area controls the size of the brush or airbrush and density controls the number of dots within that area (airbrush mode only) Any numbers can be used for these parameters, but 1 to 10 are designed to give reasonable results.

To move the cursor to a specific (x,y) co-ordinate, hit M, key in the x and y co-ordinates as two numbers separated by a comma and press *Return*.

Graphics background and mode of plot may be changed by hitting (Fig.3) G In reply to "Bgnd Col Mix Wipe" press either C M, W, or S to keep the same parameter as last time and *Return* C is ordinary plotting (GCOL0,x). M is OR plotting (GCOL1,x), and W is AND plotting (CGOL2,x). The normal option is C, but M can be useful as it mixes with the colours already there. W also allows mistakes to be erased or particular colours

If you are familiar with the CGOL parameters 0 to 4, these can be entered (as numbers) instead, and, even if you're not, entering a number greater than 4 will give striped colours and access to shades The background colour is the next prompt to appear, simply hit an fkey (function key) from 0 to 3 — they represent their usual colours — and *Return*. The next prompt asks for the foreground mode of plot and this works in the same way as for the background mode of plot, ie, C M and W have the same function and numbers can be entered if preferred — try a number greater than 4!

If you wish to default to the last known parameter on the L (area/density) or G (colours) options press S for Same, and they will not be changed.

The final facility available, used to make most of the street scene picture, is triangle area-fill. This fills in a triangle in the current paint between the next three points visited. To use that hit function key 9; your present

position is the first point and a dot is left as a reference. Now move the cursor to the second point and hit *Return*, then move to the third point and press *Return* — the area will be filled in.

When using the T (trace) and R (repeat) options, don't hold the key down for too long because the auto-repeat of the key will cause an error and this may, on model A's, be "fatal"

Model A owners should type lines 310 and 330 as below to account for the lower address of screen memory:

310 *SAVE P 1A80 3FFF
330 *LOAD ... 1A80

```
10REM (c) 2/4/83 Christopher Bowerma
n
20REM PAINTBOX FOR THE BBC-micro
30REM MODEL A OR B
40MODE7
50*K.0|||A
60*K.1|||B
70*K.2|||C
80*K.3|||D
90*K.4|||h
100*K.5|||F
110*K.6|||p
120*K.7|||E
130*K.8|||I
140*K.9|||?
150FORA=0TO1:PRINTTAB(10,2+A);CHR$141
;CHR$132;CHR$129;"PAINTBOX  ";CHR$156:N
EXT
160PRINTTAB(2);CHR$131;"A sophisticat
ed drawing and"';CHR$131;"painting prog
ram for the BBC micro"'';CHR$130;"Allow
ing drawing in four colours of"',CHR$13
0;"lines,polygons,cones etc. by brush o
r"';CHR$130;"airbrush."
170 PRINTTAB(2)'',CHR$134;"Colours are
 selected by the function" ;CHR$134;"ke
ys f0,f1,f2,f3 and it is" ;CHR$134;"pos
sible to switch from" ,CHR$134;"brush t
o airbrush by means of f4"'
180PRINTTAB(2),CHR$134,"Cursor moveme
nt is via keys:" ,CHR$129,SPC(4);"Q.W.E
 A.S.D Z.X.C"';CHR$134,"W moves UP, D r
ight, X down, A left" ,CHR$134,"S stati
onary, and diagonals are" ;CHR$134;"Q/E
/Z/C ie. Q is left and up, E is"';
190PRINTCHR$134,"right and up":A=GET
200PROCBORD(132,130)
210PRINTTAB(2)' ;CHR$131;"Erasing of
errors can be done" ,CHR$131;"by select
ing background" ;CHR$131;"colour, turni
ng erase on with f6" ,CHR$131, moving t
o erase and then hitting" ,CHR$131,"f6
again.CTRL-C clears the screen"
220PRINTTAB(1);"Polygons are drawn in
 the currently" "selected paint at the
current cursor" "position.Hit P to draw
 polygons." "Then F for coloured, and U
for" "outlined shapes"'
230PRINT"Number of sides,separated by
 a " "comma and the radius followed by
the" "RETURN key must now be entered" "
f7 controls the height-width"'"proporti
ons of the polygon, which" " is set by
f8"
240A=GET:PROCBORD(129,131)
250PRINT "Touching f7 tells the polyg
on"'"routine to take note of the ratio
set"'"by f8 Touching f7 again will make
 it" "ignore the ratio.Normaly the rati
o"'"is set to give horizontal polygons"
 "but touching f8 will give vertical"
260PRINT;"ones. hitting f8 again retu
rns" "to horizontal ones"
270PRINT'"To change paintbrush size"
"hit L.The first number is the " "brush
 size the second is the" "amount of pai
nt used by the' "airbrush."
280PRINT'"Graphics colours are change
d by " "hitting G.C to normal colouring
"'"M being hit allows you to move the "
'"cursor to a specific (X,Y)" "co-ordin
ate"
290A=GET:PROCBORD(130,132)
300PRINT"To trace a line from the pre
sent" "position hit T, move the cursor'
"to a new position and hit RETURN"  "T
o repeat a line from the last "'"start
position hit R, move to a " "new positi
on and hit RETURN"'"The increment opti
on";
310PRINT," is "
320PRINT"useful for grids and is avai
lable"'"upon hitting I after first"'"mo
ving the cursor"
330PRINT'"Lines drawn can be dotted o
r'"solid.This attribute is changed by"
"f5.If you do not wish to change"'"att
ributes after hitting " "L,M,G then typ
e S (same) and these" "attributes will
be left unchanged"
340PRINT'"Hit f9 for triangle area-fi
ll "'"Then move to 2 new points hitting
 "RETURN each time.The triangle"'"boun
ded by the spots will be filled"
350A=GET:PROCBORD(129,135)
360PRINTTAB(2);"ESCAPE will return to
 the start"'"prompt." "Q allows you to
 leave the program"'"Y will allow you t
o set up the " "colours and brush size
and A"'"lets the program do all that fo
r" "you" "S will save the screen to ta
pe"
370PRINT'"L will load a screen from t
ape" ,CHR$136;"if a recorder is connect
ed!";CHR$137
380PRINT;CHR$146;STRING$(35,CHR$(112)
);PRINT;CHR$130;"PLEASE WAIT FOR THE PR
OGRAM TO LOAD" PRINT,CHR$148,STRING$(35
,CHR$(163))
390PRINT"You will need to choose one"
 "of the above options for the" " first
 prompt";';CHR$150;CHR$154;STRING$(34,C
HR$(112))
400PRINTTAB(5);"(c) C.Bowerman. 1983"
410*K.10PA.=&CD0:NT&E00=32:?&E01=NM:R
U I%
420VDU28,0,6,0,0:PAGE=&C00:CHAIN""
430END
440DEFPROCBORD(TF,TB)
450VDU28,0,24,39,0:CLS
460FORA=0TO24:PRINTTAB(0,A);CHR$TB;CH
R$157;CHR$TF;:NEXT
470VDU28,3,24,39,0
480VDU30
490ENDPROC
```

Fig.2 SUMMARY OF CONTROLS

FUNCTION KEY	NAME	PURPOSE
F-0	RED	SELECT RED PAINT
F-1	YELLOW	YELLOW
F-2	WHITE	WHITE
F-3	BLACK	BLACK
F-4	AIR/PAINT	SWITCH BETWEEN AIRBRUSH & PAINTBRUSH
F-5	DOT/SOLID	SWAP BETWEEN DOTTED AND SOLID LINES
F-6	ERASE	TURN ERASE ON/OFF
F-7	HALF RATIO	ENABLE KEY F8/DISENABLE
F-8	VERT./HORIZ.	SWAP BETWEEN VERTICAL AND HORIZONTAL POLYGONS
F-9	FILL	FILL A TRIANGLE WITH COLOUR
T	TRACE	DRAW LINE BETWEEN 2 POINTS
R	REPEAT	REPEAT LINE FROM START OF LAST LINE
I	INCREMENT	DRAW LINE PARALLEL TO LAST
G	GRAPHICS	BACKGROUND/FOREGROUND MODE AND COLOUR
M	MOVE	MOVE TO (X,Y) POSITION
P	POLYGON	DRAW REGULAR POLYGON
L	LEVEL	BRUSH SIZE

TRLC
CONTROL C
CLEAR SCREEN

Fig.3 "G" OPTION GRAPHICS COMMANDS

ANSWER TO PROMPT	EFFECT	EQUIPMENT	COMMENT
C	NORMAL	GCOL0,x	ORDINARY PLOT
M	OR	GCOL1,x	MIX COLOUR
W	AND	GCOL2,x	WIPE COLOUR
3	EOR	GCOL3,x	EXCLUSIVE OR COLOUR - TRY B and mode 3, F2
4	NOT	GCOL4,x	INVERT COLOUR - TRY B and mode 4, F2
>4	Stripes	GCOLa,x	Shade factor for numbers greater than 4

a IS USUALLY A FKEY BETWEEN 0 AND 3, OR A NUMBER BETWEEN 0 AND 3 FOR SOLID FOREGROUND COLOURS, AND BETWEEN 128 AND 131 FOR SOLID BACKGROUND

Fig.1 KEYBOARD CURSOR CONTROL

Q	W	E
A	S	D
Z	X	C



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Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Mean

on Vic20

This is an interactive program to calculate the Mean, Sd and Variance of a set of numbers. The program runs on an unexpanded machine. It can be amended for higher memory capacities by altering the Dim() in line 50 and the Z upper limits in 80 and 85.

Variables
Z=DDATA ITEM NUMBERS:SS=SOUND
REGISTER a ( ) = DATA
ARRAY B()=FREQUENCY ARRAY
P='N' DATA. Q=TOTAL DATA. L=DATA SQUARED
S=UPPER PART OF THE STANDARD DEVIATION FORMULA (L=PX(Q/P)X(Q/P)
D=S/P(P-1). SD=SQUARE ROOT OF D

The program calculates the following variables: mean, sum of scores, sum of squares, mean squared, stand deviation (N-1) standard deviation (N): variance. These can be then inserted into other mathematical/statistical formulae.

Program notes

Lines 30-60 Set up screen and give instruction.
Lines 70-220 Prompt for input of data and test for limits
Lines 1040-1070 Calculate the total of the data and the total of data squared.
Lines 1000 Tests for division by zero
Lines 1140-1606 Calculate the mean and SD and variance for N or N-1
Lines 1610-1620 Return to the mean section on demand or terminate.

Line 90 is twenty 'shift + "', other lines contain 'reverse' or colour change which can be omitted or altered as desired for conversion.

```
3 REM■■MEAN,SD & VAR.■■BY C.WALTERS■■■■■■■
5 PRINT "■ POKE36879,25
10 PRINT "MEAN"
20 PRINT "STANDARD DEVIATION"
30 PRINT"VARIANCE" PRINT
35 PRINT PRINT "50 DATA ENTRIES MAX." PRINT
40 PRINT"■ENTER INDIVIDUAL DATA " PRINT"FOLLOWED BY FREQUENCY■"
45 PRINT"■ENTER '0' TO END DATA INPUT"
50 DIMA(50) DIMB(30)
60 Z=1 SS=36875 POKE36878,10
70 REM■■ENTER DATA■■■
80 IFZ=45THENPRINT "■WARNING■ " PRINT"■ONLY FIVE MORE DATA■" POKESS,210
85 IFZ=50THENPRINT "■■WARNING■ END DATA■" FORT=1TO100 NEXTT GOTO1000
90 PRINT "————————————————————"
100 PRINT"DATA ITEM",Z;"(0=END)"
110 INPUT X$
120 IFX$="0"THEN GOTO 1000
130 N=VAL(X$)
140 A(Z)=N
180 PRINT "ENTER FREQUENCY"
190 INPUT F
200 B(Z)=F POKESS,0
220 Z=Z+1 GOTO70
1000 P=0 Q=0 L=0 POKESS,100
1030 FOR W=1TOZ
1040 P=P+B(W)
1050 Q=Q+B(W)*A(W)
1060 L=L+B(W)*A(W)*A(W)
1070 NEXTW PRINT "■
1080 IFP=0THENPRINT "■WILL NOT COMPUTE" RUN10
1110 PRINT"MEAN=" PRINTTAB(2)Q/P
1130 PRINT"N=" PRINTTAB(2)P PRINT
1140 PRINT"SUM OF SCORES=" PRINTTAB(2)Q;TAB(15)"(SS)" PRINT
1150 PRINT"SUM OF SQUARES=" PRINTTAB(2)L, PRINTTAB(15)"(SSQ)" PRINT
1160 MS=(Q/P)*(Q/P)
1170 PRINT"MEAN SQUARED=" PRINTTAB(2)MS, PRINTTAB(15)"(MS)" PRINT
1180 PRINT "■FOR STANDARD DEVIATION"
1190 PRINT "HIT ANY KEY" POKESS,0
1200 GET A$ IF A$="" THEN1200
1210 PRINT "■ PRINT
1300 PRINT "■STANDARD DEVIATION" PRINT PRINT
1310 PRINT "■(POPULATION N-1)■" PRINT
1315 IFP-1=0THEN PRINT PRINT "WILL NOT COMPUTE,N=1!" GOTO1520 PRINT
1320 S=L-P*((Q/P)*(Q/P))
1330 D=S/(P-1)
1340 SD=SQR(D)
1350 PRINT "■■SD(N-1)=■" TAB(11)SD PRINT
1358 PRINT "■■VARIANCE=■" TAB(11)SD*SD
1400 PRINT PRINT PRINT"■■FOR SD(N) ■"
1450 PRINT "■HIT ANY KEY■"
1460 GET A$ IF A$="" THEN1460
1500 PRINT "■"
1520 PRINT "■POPULATION N■" PRINT
1550 PRINT "■■ SD(N)=■" TAB(11)SQR(S/P) PRINT
1558 PRINT "■■VARIANCE=■■" TAB(11)(SQR(S/P))*(SQR(S/P)) PRINT"■■■"
1600 PRINT "■FOR MEAN PRESS 'M'■" PRINT"■■"
1603 PRINT "■TO ESCAPE PRESS"
1606 PRINT "■'RUN STOP' & 'RESTORE'■"
1610 GET B$ IF B$<>"M"THEN 1610
1620 IFB$="M"THEN1110
```

Mean
by Colin Waterson

Open Forum

Draw

on Spectrum

This is a short but effective drawing routine for the Spectrum which allows you to draw pictures in different colours on the screen.

Z Left	0-7	Colours	
X Right	8	Change Colours	
P Up	9	Draw Circle	
L Down			

Program notes

30-80	Main Loop after the screen has been drawn by 20. Checks what key is being pressed.
7000-7130	Draws Screen, prints possible colours sales ink to black and cursor to middle
9000-9020	Inputs new colour, rubs out input, returns
9990-9993	Radius of circle draws circle, rubs out input.

Variables

X	X Coordinate
Y	Y Coordinate
ink	ink colour
rad	Distance of radius of circle

```
  10 REM Spectrum Draw
  15 REM
  20 GO SUB 7000
  30 IF INKEY$='z' THEN LET x=x-
1  IF x<5 THEN LET x=5
  40 IF INKEY$='x" THEN LET x=x+
1  IF x>188 THEN LET x=186
  50 IF INKEY$="l" THEN LET y=y-
1  IF y<5 THEN LET y=5
  60 IF INKEY$="p" THEN LET y=y+
1  IF y>170 THEN LET y=170
  70 IF INKEY$="8" THEN GO SUB 9
000
  78 IF INKEY$="9" THEN GO SUB 9
990
  80 PLOT INK ink,x,y
  85 GO TO 30
7000 CLS  BORDER 6  LET ink=0
7010 PLOT 0,0  DRAW 0,175  DRAW
255,0  DRAW 0,-175  DRAW -255,0
 PLOT 192,0  DRAW 0,175
7020 PRINT AT 1,26, INK 1, "■", I
NK 0,"=1"  BEEP .5,1
7030 PRINT AT 3,26, INK 2, "■", I
NK 0,"=2"  BEEP .5,2
7040 PRINT AT 5,26, INK 3; "■", I
NK 0,'=3'  BEEP .5,3
7050 PRINT AT 7,26, INK 4, "■", I
NK 0, "=4"  BEEP .5,4
7060 PRINT AT 9,26, INK 5, "■", I
NK 0,"=5"  BEEP .5,5
7070 PRINT AT 11,26, INK 6, "■"
INK 0,"=6"  BEEP .5,6
7090 PRINT AT 13,25, INK 0, "■",
INK 0, "=0"  BEEP .5,8
7100 PRINT AT 15,25,"7=rub"  BEE
P .5,9
7110 PRINT AT 17,25,"8=new",AT 1
9,25,  "col",  BEEP .5,10
7120 LET x=100  LET y=88  PLOT x
,y
7130 RETURN
9000 INPUT "What colour ?",ink
9010 INPUT ""
9020 RETURN
9990 INPUT "Radius ?",rad
9991 CIRCLE INK ink,x,y,rad
9992 INPUT ""
9993 RETURN
```

Draw
by Alex Reeves

Microradio

GW6JJN

Input and output

New from Number One Systems of 9A Crown Street, St Ives, Huntingdon, Cambridgeshire, comes an electronics circuit computer aided design (CAD) program for the Spectrum, BBC B and Newbrain computers. It must be stressed that this is a serious program designed for people who wish to test a proposed circuit on the computer without the need to set the circuit up.

With this program, there is no need to actually solder anything. All one needs to do is to come up with the idea of a circuit on paper and, using the extensive instructions provided with the package, transfer the circuit to the computer. Once details of the circuit are in the machine then the behaviour of the circuit will be simulated and can be analysed for input and output impedance, and gain, both magnitude and phase at any frequency both linearly or logarithmically spaced.

If you don't know what I'm talking about, then the program is probably not for you. If designing and testing circuits are exactly what you want to do with your machine, then read on. The program will simulate the behaviour of resistors, capacitors, inductors, transformers and both field effect transistors and the common or garden bipolar transistor. The ac performance of circuits containing up to 60 of these components situated around up to 16 nodes can be evaluated over a large frequency range without even the need to have the components concerned.

The sort of circuit that the program takes in its stride are filters, audio and wideband amplifiers, radio frequency amplifiers, linear integrated circuits and many more. An interesting feature is the program's ability to deal with operational amplifiers as integrated components in themselves. This opens up a wide range of possibilities as you can imagine.

It does not incorporate graphics which are memory hungry, but it has the facility to store circuits on tape and any circuits that do not measure up to expectations can have their parameters changed as well as any components. A serious program with a serious price, it costs £38.

I hope to demonstrate the use of the program in a future Microradio, but until then any further information can be obtained by writing to the above address or by contacting Adrian Espin or Martin Morris at Number One Systems, on 0480 61778. As far as radio computing enthusiasts are concerned, I should add that the program will deal with frequencies between 0.01 Herz and 1.1 GigaHerz.

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered write to Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

Eerie green landscape

Software companies are all hurridly climbing into their tanks and lining up to take pot shots at each other across 'an eerie green landscape of pyramids and squares

After a thousand and one versions of *Pengo* they finally seem to have turned their hands to producing *Battlezone* clones.

For the Spectrum there have long been two very respectable versions namely Artic's *3D Combat Zone* and Crystal's *Rommel's Revenge* Although I think the graphics of the latter are better (if you like the wire frame effect of the arcade original) it is a matter of personal choice which game is regarded as more playable However there is now a new release, *3D Tank Duel* from a new company called Real Time which is faster than both the earlier games and extremely playable It uses a slightly different approach to the landscape graphics but is an exciting program and worth a look for those of you who haven't already bought one of the others

3D Tank Battle for the BBC from Dynabyte at first sight appears superb Not surprisingly the Beeb's graphics allow a better attempt at vector graphics than the Spectrum can manage and this looks a lot like the original game Unfortunately you are only allowed to be in charge of a gun emplacement and not a tank, so you cannot manoeuvre to chase or hide. It is a perfect example of how to turn a tense game involving strategy into a bland shoot 'em up I hope the company aren't discouraged if sales of the game prove less than they hoped because the BBC badly needs some original programming talent to stretch its abilities and match the progress made with the Commodore and Spectrum

Vector graphics

However, when writing a game it is as important to pay attention to what makes a game addictive as it is to produce good graphics To prove the point *Encounter* from the American company Novogen for the Commodore and Atari machines is a *Battlezone* version that has received rave reviews over there even though its graphics are rather block-like (they seem to have abondoned any attempt at vector graphics with the resolution possible on a home micro) Yet the game is outstanding because it is what *Battlezone* should be, very fast and very exciting

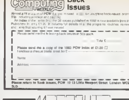
Whilst on the subject of arcade copies if you want a really good version of *Zaxxon* for the BBC then run out and buy *Fortress* by Amcom. This easily matches the "official version" sold for the Atari in this country by Centresoft, and shouldn't be missed.

Alligata have released *Loco* for the Commodore which is an arcade copy even though the original game never really took off and will not be familiar to most people It involves "shooting down various airplanes and the like by firing steam from your locomotive before they can blow you up The graphics and sound are excellent.

Finally *Moon Alert* from Ocean is one of their best releases to date and was well worth the extremely long wait since the adverts first appeared. This company gets better and better and have produced without doubt the best version of *Moon Buggy* for the landscape jumping over craters and rocks and shooting upwards at a collection of motley aliens.

Tony Kendle


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Tony Bridge's Adventure Corner



Instant death

Last week I finished off by talking about *The Devil to Pay*, by Computascope For Fun, and had a few sharp words to say about the spelling, grammar and general layout of the program.

I realise that spelling is not everyone's strong point, but the market for silly howlers has been cornered by Carnell, and in other programs, careless mistakes just become tiresome — at best, exasperating. When, as in *The Devil to Pay*, we are treated to consistently mis-spelt words and bad grammar, one can only wonder if even the author has bothered to look at the game.

On to more new releases. First off, let's get the bad news over with. A considerable amount of high-powered advertising has been taking place over the past couple of months, in order to get you to part with your hard-earned cash in exchange for CRL's new adventure *War of the Worlds*.

According to the very glossy adverts, it's a "strategic arcade adventure" — yet another combination of sales grabbing words. We'll come back to those classifications in a moment, but for now, let's look at the program.

After the titles, we're straight into the main playing area — almost, anyway! It's up to the player to find out that he has to touch a key before anything happens. This sort of thing is pretty obvious, I know, but it is the smallest effort to inform the user. Once into the game, we are presented with a condensation of the first few chapters of the book, complete with a feeble Spectrum-ised version of the famous Jeff Wayne-written music. It's a pity that this opening sequence has to be sat through every time you want to play the game. Now to the game proper — you'll find it reminiscent of *Valhalla*, with your little man striding across the screen before a background of suburban semi-detached houses. The graphics are not exactly state-of-the-Art; the little stick-man is bearable, but the scrolling is very coarse and unconvincing.

The object of the game is your search for Carrie, the girl you love, and your adventures in this quest.

The Martians are invading the Earth and it is when they appear that the faint stirrings of doubt in the player's mind reach a crescendo. Despite the fact that the player may be getting along well in the adventure and strategic departments, suddenly along hops a 30-foot spider and zaps you with a red line! Well, it wobbles about a bit, luring you into thinking that you might escape it, but I'm afraid that skill has no place in *War of the Worlds* and you are doomed to become Martian fodder.

It's a pity that the "arcade" (CRL's term for the extremely wimpish and unfair instant death) part of WOW makes the adventure parts so unrewarding to play.

The Odyssey of Hope comes from Martech games, and is a graphic adventure. The tape contains two programs — on the first side, instructions and game, on the other side, the game alone, which seems a good idea. The instructions need a program all of their own, taking the form of an on screen book. As you press Enter, the pages turn, and reveal the story of Pandora's Box. Hope has been stolen from the box, the Gods are angry, and it is your mission to recover it.

The graphics are pretty simple, but a constant on screen read-out of visible objects and strong colours add to the interest.

Vic20 owners have had a rather rough time lately, with not many new adventures being released. It's nice to report, then, that a Vic owner (not an established software house) has taken matters into his own hands, and released *Adventure School* for his machine.

Richard Terry tells me that "as you might imagine it is set in and around school. You start in a fish and chip shop and have to find five valuable objects. When these are found, you give them to your Mummy to receive a surprise!" Probably a clip round the ear — you should be at home eating your dinner! For £4.50, or £4.00 if you enclose your own tape, you too can experience the delights of the local Chippy. Write to Richard at Stable Cottage Englefield, Nr Teale, Reading, Berks RG7 5EL.

Artic were really the first adventure-writers for the ZX machines, and their infuriatingly simple-looking programs have been causing loss of hair, divorces and smashed television sets for many years now. Each new adventure has been received with gratitude by just about every Sinclair adventurer.

I'm afraid, though that the latest is a disappointment — which is unfortunate for the program's author because A, B, C, and D (and, to a lesser extent E, *Golden Apple*) are all extremely hard to follow. The latest program, *Ground Zero*, is not, in itself, a bad adventure; the scenario has you in the wasteland of post-nuclear Britain. The problems you will meet are the ones you might expect — it's a pity, however that the location descriptions, as far as I've seen, are not particularly atmospheric.

This is, as Artic say, "a very large adventure", and these are first impressions. Gilsoft are entitled to a mention somewhere, Artic, so if you reprint this one please ensure that mention is made of The Quill's involvement.

Talent Computer Systems is funded, in part, by the University of Strathclyde. They have recently released several programs — the one that interests us at the moment is *West*, a graphic adventure for the CBM64 and BBC/Electron. It's set in the year 1884, somewhere in the Wild West, and you are on the trail of a notorious gang of bank robbers. You must outwit and outgun them and recover the loot.

This is a very professional-looking program, well laid-out and with, thankfully, no spelling mistakes. The main picture is of the Main Street, and, as the day progresses, you will see the sky changing colour. The picture is generated by Talent's own graphic utility, *Panorama* — if this is the sort of picture that can be drawn with it, then *Panorama* can be recommended.

Apart from the bad habit of the Commodore's keyboard to hold your keypresses, the game is conducted very quickly. An adventure, in sum, about which I expect to get many questions. Buy it now from Talent Software, Curran Building, 101 St James Road, Glasgow G4 0NS.

This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So, if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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Key decision

R McKean of Higher Blackley, Manchester writes:

Q **I am considering the purchase of the Casio MT 200 keyboard featured on the cover of *PCW* dated May 24, but would like to make sure that the keyboard and necessary interface are compatible with my Dragon 32.**

Also, could you give me any information on where to obtain details of the PA1 interface, as I am doing this as a college project.

A The Casio keyboard requires that the micro be able to receive the Centronics interface, which your Dragon can. To obtain more details of the PA1 interface you should ring Casio on 01-450 9131

The age of Aquarius?

Q **At Christmas I acquired an Aquarius computer. The main difficulty I find with it is the software (or lack of it). I have enquired in a number of local shops, which stock Vic 20, Electron etc software, but with no sign of anything for the Aquarius. Surely with all the publicity that was given this computer at Christmas time there should be by now more software available.**

I would be grateful for any advice you can give me.

A The Aquarius has suffered from the cut-throat competition for space on the software shelves. As it did not make a major impact in the market it lost out in the software stakes. Also, the decision by Mattel to drop the machine did nothing for it's popularity with retailers or software houses. There is as you say a dearth of software for this machine.

Do not lose heart however, Radofin Electronics who manufacture the Aquarius and are committed to its continued development. My advice is to write them asking for the address of your nearest stockist of Aquarius computers as they will also stock the software. Radofin's address is: Radofin Electronics (UK) Ltd, Home Computer Division, Hyde House, London NW9 6LG

A waiting game

E Sanders Leamington Spa, Warwickshire writes.

Q **I have long intended buying a computer, but because of the many new models coming on the market, I have deferred buying until things settle down.**

I did have a ZX81, but something went wrong with it and I put it aside to wait for something better. Last week on the spur of the moment I bought a small computer, a Tandy MC10. It had been reduced to £39.95 as it is now obsolete. The machine has been described as a ZX81 with colour, and I thought it might be a more interesting machine to study machine code on. However, since buying it I have come to realise that although it is a very good quality machine there is very little in the way of books or software available for it. My local Tandy shop is no help, they seem to know less about computers than I do.

There appear to be no clubs or magazines which might help me, so I am writing to you in the hope that you can advise me. It is possible to upgrade this machine to 20K but there is not point in wasting more money if no information is available on the machine.

A Two possible sources of information for you are the Tandy User Group Remsoft, 18 George Street, Brighton, and, of course, Tandy themselves at Tandy (UK), Tameway Tower Bridge Street, Walsall WS1 1LA.

I must say that I have a lot of sympathy for you, having held off for so long before buying a machine. I am surprised that your Tandy shop is no help as I have always found the staff in those shops to be particularly helpful.

I don't think that I would reccomend that you upgrade your machine, at least until you have contacted the two addresses above and have determined what software and support is available for it.

Speed essential

M Symonds of Munsterworth, Glos writes:

Q **I am a regular reader of your magazine. I own a Commodore 64 and would like to purchase a disc drive. I have seen the VIC 1540 drive but it is slow in disc terms, ie it takes 18 seconds to save a 6K program and 12 second to load it back. I would like to know if you can buy a disc drive which can load and save faster than the Vic 1540 disk drive.**

A Commodore announced a new disc unit for the 64 and Plus/4 at the Chicago CES which is claimed to be four or five times faster than the present unit. It should be available in this country in time for Christmas.

Commodore disc drives are notoriously slow. Even if you can't wait for the new drive to arrive, I don't know of any faster Commodore compatible drives that are available on the UK market at the moment.

One small point, if your interest is in merely saving and loading programs faster, why not buy one of the many cassette fast-load programs available for the CBM 64 to speed up cassette loading time.

Joystick trouble

Andrew Sweeney of Glasgow writes

Q **I hope that you can help me. For Christmas I was given a Cheetah 32K Rampack making my Spectrum into a 48K one. A few weeks ago, for my birthday, I was given a Kempston joystick interface. When I tried to use my joystick with the rampack I discovered to my horror that I could not. When I plugged in the interface I could not plug in the joystick.**

Please could you give the name and address of someone who could help me? I just want to use the joystick for 48K games.

A I suggest that you contact Timedata 16 Hemmels, Laindon, Basildon, Essex SS15 6ED who should be able to fix you up with a suitable connector. One last point. Cheetah maintain that their Rampack is "fully compatible with all accessories", have you put your problem to them?

If not I would at least they will then be aware of the difficulties of using certain devices with their 32K Rampack.

Starting young

Mark Hadman of Whittlesey Cambe writes

Q **Could you please help me with the following. I am nine years old and I would like to buy a cheap, easy to use Vic 20 machine-code book for complete beginners.**

A Anyone who wants to learn machine-code at nine years old has got to have a future in this business. As a start, you could try *Advanced Basic and Machine Code Programming on the Vic* published by Duckworth. This retails at about £6.95 and is one of the cheapest and easiest books I've found

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Phil Rogers and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, *PCW*, 12-13 Little Newport Street, London WC2R 3LD

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ZX81 16K RAM mags + 7 games £48 Tel 4pm weekdays 0246 418088

ALPHACOM PRINTER for Spectrum or ZX81 £45 Currah Micro Speech for Spectrum £20 both as new Tel 021 778 1719 after 6pm

ZX81 £15 inc 16K Ram pack £8 00 £21 00 worth of software £10 00 Spare manual £1 00 Spare power pack £3 00 or the lot £35 00 or swap for ZX interface 2 and joysticks Tel Halifax 21 156

Ataris for sale

ATARI VCS in mint condition with 15 titles including Vanguard, Megamania, Asteroids Star master Pac Man Demon-Attack plus accessories making a total of £360 but only asking £109 Telephone 893 4236

ATARI Vera Writer drawing tablet. Cost £240 Will sell for £75 ono Tel. 01 571 1309 after 5pm

ATARI VCS 5 cartridges ie Combat, Space Invaders Pac Man Night Drive, Bowling £99 ono Tel 061 226 7941

ATARI 400 32K memory boxed as new Games available £95 Tel 0734 886 251

ATARI VCS and 13 cartridges joysticks paddles and cartridge holder Cartridges include Demon Attack and Asteroids Sell for £140 Phone Neil on Brighton (0273) 414587 after 7pm

Tandys for sale

TANDY extended Basic 16K colour computer 5 books 1 Rom cartridge game 1 microdeal cassette John Stevens £80 Bristol 277528.

TANDY 4 colour printer plotter excellent condition 3 rolls of paper Cable to suit Dragon Will send print sample £90 00 Tel (0202) 892833 after 6pm.

TANDY CP 115 printer New with Dragon cable £80 ono CBM 64 Future Finance (disk) £40 ono Tel Robll 01-550 1355 (after 6pm)

COLOUR GENIE 32k two manuals, s/w little used £100 or swap for 48K Spectrum in similar condition Ring Bandford (0258) 66248

APPLE II disk drive assorted s/w Language card DOS 3 3 Pass £650 Tel 01 965 4622 day Eves 01 287 1975 (Jon)

Wanted

SWAP 48K SPECTRUM with joystick and interface cassette recorder some software dust cover (still under guarantee) for Commodore 64 with or without extras. Must be under guarantee Phone 807 1204

PENFRIEND WANTED for TRS-80 Model I Owner can be boy or girl wants to swap ideas games hardware Write to J Brods 39 Tetbury Drive Warndon Worcester WR4 9LG Tel Worcester 53248

WANTED 8K RAMPACK for Sharp PC 1500 Up to £35 Tel Tiverton (0884) 256119

WANTED ZX81 16K with software if possible Also with cassette recorder Pay up to £90 Tel 0472 812345 (after 8pm)

SPECTRUM S/W to swap Grail Spec Dictator Trans Am Stonkers and others for Tlexl Advent) (not Artic) Mills, 9/1 Cobb nshow House 16 Calard One Edinburgh or tel 031-453 2831

WANTED BBC B 1 2(OS) Phone 0332 556381

SWAP HALLS of the Things for H U R G or Splat. Steven Swindells 2 Willow Blvd Cheadle Hulme, Cheadle Cheshire SK8 7NR.

WANTED VIC-20 Swap for Aquarius home computer + cart + books manuals, leads etc. Tel (0204) 594353 (after 6pm)

SWAP BBC disc s/w ie Aviator Zaxxon Cybertron Peel Horse Race Corborate Climber Pengo + JCB Digger Phone Pete on Harrogate 711938

WANTED BBC B. 1.2 O/S. A/O Cumana disc drive (BBC) 8.30-6pm 061-723 2467

SPECTRUM S/W not for keeps — just to swap for 1 week or 2. ie Chucky Egg Jet Set Willy Blue Finger Bugle Alley etc Tel 0636 78106 after 4pm.

VIC 20 SWAP for BBC 206 games C2N deck. Tel 800-1307

WANTED CBM 64 + discdrive Reasonable Price F L Cox, tel 0952 86833

ALL CBM 64 users s/w wanted Swap or sell Tel (174) 22938

WANTED COMMODORE 64 with C2N cassette deck £120 Spectrum £90 and BBC B £200 BBC Monitor £120 Phone (05827) 60112

CHEAP 16 (preferably) 48K Spectrum with manual for London area. Tel Chris on 01-735 3426

C64 S/W swap Valhalla + Hobbit, Quickshot 2 joystick Tel Richard 061-733 0070 (after 4pm)

SINCLAIR SPECTRUM s/w (all enquiries) to sell or swap. Tel Havant. 0705 47358.

BELGIUM CBM64 + VC1541 swap programs (more than 400) Write to Jacques de Jonghe 58 Rue Richard Orban 4351 Berlo. Belgium Tel 013 32533 in Belgium Please contact me!!

COMMODORE 64, C2N recorder joystick and over £100 of software including Duckworth extended Basic Swap for Electron + Recorder + £50 (negotiated for software) or large sum of money (01) 853 3801 London

COMMODORE 64 Radar Rat Race, Ram Pack and a Speech Synthesizer will swap for Microdrive or sell Offers Model I Tandy Expansion Interface Wanted will swap for Spectrum Worc. 53248

WANTED SUPERBASE 64 Bristol 833617

SECOND-HAND SPECTRUM games wanted! Originals only (with inserts etc) disliked overzapped/disappointing games — I'll buy them! offer by return post! Gordon Angus 37 Cockburn Street Edinburgh EH1 1BP

WANTED CURRAH speech unit About £20 Telephone (0582) 262684 after 5pm weekdays and 2pm weekends

SPECTRUM COMPUTING No 2 cassette wanted Will pay high price and postage Send proposition to R Betz, Chemin du Moulin 36 — 1328 Ohain Belgium

WANTED NON-WORKING ZX81s and Spectrum — for cash Any condition 0772 632845

COMMODORE 64 speech synthesiser will swap for Spectrum Interface I or sell offers Wanted TRS-80 Model One Expansion interface no memory new disc Also Vic 20 16K Ram Pack Tel Worc 53248

WANTED 48K issue 2/3 Spectrum software not needed but will consider add-ons Telephone Hemel Hempstead 63377 evenings and w ends

COMMODORE 64 software available for swapping Many American titles Telephone 0800 4633

BARGAIN £70 worth of Spectrum books including The Spectrum Handbook and 4 Melbourne House Titles Will swap for Spectrum Interface I or £35 Wanted E/I for Tandy Mod I Worc 53248

WANTED CP Soft Superchase 3 0 Will swap for other Spectrum software Tel 061 430 6504

SPECTRUM SOFTWARE to swap including Doomsday Castle Alchemist, Boogaboo The Flea Zip Zap Telephone Jason on Pontefract 703036 between 4-8pm

WANTED TI-99/4A Mini Memory and manual Also expansion box etc If reasonably priced Tel (0782) 627581

WANTED BBC Model B (software if possible) Swap for 48K Spectrum including joystick software magazines. Plus Atari VCS with six cartridges Both in excellent condition Please contact Somerby 416 (Leics)

SWAP COMMODORE 64 Hobbit for Ultisynth or Multisynth tape for 64 Phone Irvine (0294) 73445 after 7pm.

SWAP ELECTRON software Phone Harpenden (05827) 5232 Ask for Ian After 5pm

SPECTRUM 48K + £100 software joystick interface joystick + cassette recorder to swap for BBC Model B 1.20 S Tel 0865 721541 (Oxford) after school time (4pm) please

SPECTRUM SWAPS Valhalla for Hobbit JetSet Willy for Codename Mat, Atic Atac for Fred Please write to T Williams Waenlan Nanternis nr Newquay Dyfed or Phone 0545 580680 after 6pm

VIC 20 SOFTWARE to swap or sell Arcadia £3 50 Catcha Snatcher £3 50 Flight 015 £4 00 All in good condition Contact J Boyer 30 Nightjar Close Creekmoor Poole Dorset BH17 7YN

ACORN ELECTRON games wanted in exchange for Spectrum games I have Spectrum games from Silversoft Psion Imagine and wise games for the Acorn Electron Ring (0823) 891871 after 4 o clock.

FOR SWAP or sale (Spectrum Software) Zoom Planetoids Espionage Island or Fix for Trashman Krakatoa Night-gunner or dibalita Ring 061 928 8354 (after 5 o clock)

WANTED SCREW thread zoom lense for use on Practica camera Wide range of Spectrum software to swap for it. Send offer to Mike, Misty Willows Hall Road Tolins Essex CO5 ORJ

SWAP MY Spectrum software for yours (originals only) including Zaxxon Rider speed duel +20 more Send to I Bristow Eastside Bonlworth Chippenham Wilts SN15 5DX enclosing I ol

WANTED CBM 1540 disk drive in good condition for Vic20 Give £130 and p&p Tel 0232 61950 after 6pm or write to P Cassidy 36 Riverdale Park East Belfast.

WANTED 8271 floppy disc controller chip for BBC Micro Please write stating required price Jerry Lakin 6 Ullswater Avenue, Edith-Weston Oakham Leics LE15 8JD

SWAP SPECTRUM s/w hunchback, meteor storm eye of Star Warrior, Spectrum Invaders and Planet of Death for Oric Atmos s/w Tel (0582) 596576

SWAP ORIGINAL Spectrum Tapes Planetoids Galaxians Hungry Horace Miner Cavern Fighter Arcadia Krazy Kong Ring Sheffield 0742 461623

SPECTRUM KEYBOARD wanted Swap for s/w Tel Llandudno 72404 after 5pm

WANTED URGENTLY plug in Ram extension before for issue 1 Spectrum Tel 01 888 1615 Peter Rider

SWAP SPECTRUM s/w inc Pogo Crash Rider Jet Set Willy Hurg & others. Tel John 476 6884

SPECTRUM GAMES to swap Timegate Ship of the Line Chequered Flag Transversion Ground Attack Test Match Snooker (Visions) Flight Simulation Hamer Attack Tel (0677) 43367 Ask for Alan

SPECTRUM PRINTER urgently required willing to pay or swap games POGO, Chequered Flag Thrusta, Ometron Firebirds Hard Cheese or Bubble Trubble Over 150 titles available Phone after 7pm. Ask for Haggis 081 771 1164

WANTED issue one Ram Upgrade to bring my Spectrum up to the full 48K Willing to pay £15 Phone Carrickfergus 65 797 and ask for Sean

WILL SWAP my Drive Databank original tape for original copy of Danger Ranger Phone Hamilton 422697 Ask for Paul

WANTED Faulty computers for spares. Will pay £30 Vic 20 £30 Spectrums £100 BBC B Will collect St Albans 51203

SWAP MY BMX Mongoose Bike in excellent condition in part exchange for BBC Model B, Must be in perfect working order Tel 01 701 1936.

SWAP VALHALLA By Legend in exchange for The Quill must be original Send me your game for immediate reply First come first served Tel 03643 2420

VIC 20 S/W swap or sell Cartridge Star Battle Mission Impossible Mole Attack Mertagenie Cassettes Catcha Snatcha Wacky Waiters Scramble Night Crawler Space Phreks, 3D Time Trek. All original Cricket buying Tel Simon Andrew Jnr 041 772 1478

SPECTRUM AND DRAGON software swap Many titles Write for details to Robin England Church on the Way Churchill Rd Thetford, stating which computer you have

WANTED any system with 32K Ram disc or just interface Must have good graphics Tel Jeff (0525) 384874 (eves)

SWAP 48K Spectrum + £100 games tape recorder for C64 + tape recorder S/w not needed Tel 0622 872269 Jason (after 8pm)

DRAGON SOFTWARE swap — wanted Composer Bitty Sprite Magic I have Defense Glaxxons Onerunner The King Zaxxon Defender Two for one basis Write to Paul 58 Balfron

Crescent, Earnock, Hamilton, Lanarkshire

SWAP complete photographic dark room for dragon disc drive 0274 589959 after 5.30pm Anthony Howarth

ATARI DONKEY KONG for sale or swap Tel 422 8375 after 4pm

BLACK CRYSTAL for 48K Spectrum Alchemist Swap for Digger Dan or Dig Dug Tel Northampton 0604 718557 Ian

S/W EXCHANGE. I have over 300 BBC programs (on disc and tape all originals) For Spectrum or CBM 64 programs Tel 05827 69152

WANTED ATOM programs suitable for 12 × 12 machine Any kind considered. Must be cheap Also Atom Books Write with details and price to Steve Woolley 43 Jessen Street, Gorton Manchester M18 8SX

CBM 64 C2N recorder EC Reed, cartridges s/w inc. International Soccer Forbidden Forest Aztec Challenge joystick, manuals mags. Cost £370 Accept £225 ono or swap BBC B + money Tel Reading 874789

SWAP CBM 64 s/w inc International Soccer Phone Jane 021 556 8201

For sale

ORIC MCP40 colour printer with paper hardly used 5 weeks old £100 ono Tel Rochdale 31239 Mrs Stone

TRS80 level 1 basic instructions part (4 cassettes) £5 00 Tel 0793 870827

SHARP MZ 80K & lots of S/W games education and utilities. Assembler & disc assembler £190 ono Tel 0829 37853

LYNX 96 good condition with leads manual & some S/W £190 or swap Acorn Electron Tel Ramsey (0487) 841677

LYNX 48K Excellent condition still under guarantee Book & £40 of S/W Will swap for good condition CBM64 or £135 ono Tel 01 527 8599 after 6pm

SHARP MZ80 B disc S/W All originals & manuals accounts, data base wp mail pro super calc m basic c basic & many games £250 ono The lot. Tel Mal (0222) 552228

ZX PRINTER for sale Brand new £32 00 reason for sale upgrading Tel 01 340 1119

METTEL Intelevision — with assorted cartridges All offers. Tel 01-458 7828

WALTER Printer WU2000 + screen dump program for BBC B Unused original packing Urgent sale required Offers invited Tel 021 458 3637

INTERFACE 1 microdrive and cartridge all as new £80 Dennis Waugh 7 Nursery Lane Brigsthorpe Northampton NN2 7QG

SAKER Z80 data entry pad As new much operating s/w available Retails £699 only £250 or swap BBC B or similar micro or printer other hardware Details 0491 874117

TI994A, Speech synthesis joysticks recorder and leads beginner's basic cassettes, stick stick Atari interface manuals £130 or swap for Atari with recorder Tel 01-407 7440 also modules (POA)

MACHINE CODE PACKAGE for Spectrum includes picturesque assembler and editor CP assembler disassembler, 2 machine code books Melbourne House Softek Comp m/c magazine As new just £22. Tel Colchester 98621

COLECOVISION with Turbo and Donkey Kong £105 ono or swap for 48K Spectrum (good condition only) Tel 01 701 4380

SHARP PC1211 programmable computer + manuals £200 Tel 794 3372

2 ROM CARTRIDGES, Munchman + Zero Zap 1 joystick interface + cassette leads. For TI99/4A £25 00 Maidstone 47601 after 6pm.

400K DISK DRIVE for sale with over £100 of BBC s/w inc Disc Doctor Rom Business and the latest games. Value £1200+ sell for £450 Tel (05827) 69152

16K SOLIDISC sideways Rom for BBC supplied with over £1500 of s/w inc. most Roms on the market. Worth over £1500 Sell for £150 Duplicated prize. Tel (05827) 69152.

SHARP PC 2600 complete with built in Thermal printer + magnetic card reader price £30 ono 01-736 3426

DISC DRIVE. Olivetti 5¼ as used by Acorn S/s s/d 100K with leads, manual, utility disc 7 months guarantee £100 DFS £15 Speaking watch £30 Telephone Hornchurch (04024) 71788 after 6pm

GAMES DESIGNER for 48K Spectrum for sale £8.00 Tel (0702) 41940

MICRODRIVE plus seven cartridges plus interface one £75. Also several rolls of Sinclair printer paper Rickmansworth (0923) 777048 (NW London)

FOR SALE One-1 48K Interface plus Quickshot Atari joystick, data invaders Bricky Hopper Galaxians Hunchback, Acheron Loki, Mushroom Star fighter Xeoon 1 Zorgon Fantasy Hobbit, worth £300 Sell for £170 Phone 0642 311132

LYNX 48K, with cassette recorder leads and software including data file £130 ono Tel 061 633 7888

CBM 1515 and 1520 printer plotter cane ribbons paper manuals etc Both full working order £250 Tel 01 840 3610

LYNX 48K boxed cassette recorder manuals leads machine code book, chess game Intrtape 90 + mags Cost £320 Sell for £170 ono Tel Bolton (0204) 82085

ONE MICRODRIVE interface I, 5 blank cartridges £80 00 Tel 01 888 5707

INTELLIVISION games system 9 months old with sound module 3 sound cartridges + 20 other cartridges. Bargain at £350 May split Some colecovision cartridges for sale 01-764 4075

GAMES DESIGNER £10 Valhalla £10 Doomsday Castle £4 Adria £4 Molar Mawl £2 Arcadia £3 Zoom £4 Ashron £3 for Spectrum all originals. Tel 883 077 Nottingham

ORIC 48K book + cassettes ie Machine Code Forth and Hunchback, £90 00 Tel 01 393 8550

ADVENTURE HELPLINE

Escape from Pulsar Seven/Golden Baton. How do you find the light. How do you find the parchment and how do you use the quartz against the lizard man? Leon Bolt, 72 Latimer Rd, Whipton, Exeter, Devon.

Denis through the Drinking Glass on Spectrum. I cannot find the flask of drink. Robert Nunn, 35 Palm Rd, Romford, Essex.

Espionage Island on Spectrum. I can't get further than the native woman. Edward Callan, 48 Raheen Ave, Tallaght, Dublin 24

Planet of Death of Spectrum. I have got past the forcefield but I cannot get my space ship free What does 'no dusty bin rules' mean in the lift, and can you shoot the guard? Mark Rugman, 734 Derby Road, Wingerworth, Chesterfield.

The Hobbit on Spectrum. How do I avoid recapture after escaping from the goblin's dungeon? Where is the magic ring? John Hedees, Flat 6, 56 Oxford Rd, Littlemore, Oxford.

Ring of Power on Commodore 64. On the second level, having crossed the sea, there is an exit 'up' on the beach. But when I try the location is merely repeated. How do I go 'up'? P Barnard, 16 Ashwood Rd Rudloe, Corsham, Wilts

Fantasia Diamond on Spectrum. I can't cross the river; what does 'wait for it' mean? Kevin Doull 5 Lindsay Place, Wick, Caithness

Murder at the Manor on Spectrum. Where is the ladder? Where is the manor? G U R Howard, 31, Springfield Rd, Windsor, Berks

Zork 1 on Commodore 64 How do I get into Hades and how do I open the grating? Nigel Norse, 11 Green Leafe Ave, Wheatley Hills, Doncaster

McKensie on Spectrum. How do I get out of prison? What is the rusty robot for? Mark Hutchinson, 61 Church Rd Church Hotel, Franworth, Bolton.

1815 Pirates Cove on Vic20. We cannot get out of alcove and do not know any magic words. Mrs S Johnson, Greenbanks, St Austell Rd, Probus, Cornwall.

Alchemist on Spectrum. I cannot find the spell of destruction or any more locations Tim Hortopp 53 Walcheren Place, Hamworthy, Poole, Dorset

The Quest of Merravid on Vic20. Once you have killed the dragon, how can you get the firestone? Ian Swan, Nether Cambushinnie Cottage, Kinbuck, Dunblane, Perthshire.

Dungeon on Spectrum. I can't get past the giant rat I can't get past the swirling grooved rock. I can't enter where the splintered flint hurls you back. J E Tyson, Post Office Langport Somerset

Diary

Event	Venue	Dates	Admission	Organisers
Electron and BBC Micro User Show	UMIST Manchester	Aug 31-Sept 1 10 00am-6 00pm Sept 2 10 00am-4 00pm	£2.00 adults £1.00 children	Database Publications 68 Chester Road Hazel Grove Stockport 061-456 8383
Games Day 84	Royal Horticultural Society's New Hall, Greycoat St London SW1	Sept 1 10.30am-6 00pm Sept 2 10 00am-5.00pm	£1.25	Games Workshop 27/29 Sunbeam Road, London NW11 01-965 3713
Hampshire Computer Fair	Guildhall Southampton	Sept 6 11 00am-9 00pm Sept 7 10 00am-5.00pm	Trade - free Public - £2.00	Testwood Exhibitions 0703 31287
Walthamstow 84	Main Exhibition Hall Waltham Forest Technical College Forest Road, London E17	Sept 8th 10 00am-5 00pm	£1.00 adults	London Exhibitions and Promotions 38 Exeter Gdns., Ilford, Essex 01-554 8039
ZX Microfair	Alexandra Palace London N22	Sept 8	£1.00 adults 50p children	ZX Microfairs 71 Park Lane London N17 0HG 01-801 9172

New Releases

Arty

Graphix IV is probably the cheapest Commodore 64 extension to Basic program I've yet seen at £9.99. And as any C64 owner will be only too aware the machine could do with one.

This program adds 16 new commands to the machine, all of which are concerned with graphics. The actual program resides at $C800, and so doesn't conflict with ordinary Basic.

Colour sets the foreground and background plotting colours in high res. *Draw* draws a line from a point previously defined. Other commands include *Paint*, *Plot* and *Character* which allows the character set to be easily redefined.

The program comes with a useful manual explaining how to use the new commands.

Graphix IV may not have the extra sound commands of some other Basic extensions but then look at the price difference.

Program	*Graphix IV*
Price	*£9.99*
Micro	*Commodore 64*
Supplier	*Zipprint, 96 Bournemouth Road, Parkstone, Poole, Dorset BH14 9HY*

Get the Bird

Fantasy have previously been known for arcade games like *Pyramid* where you zapped a variety of aliens in seemingly endless chambers. To a certain extent then *Beaky and the Egg Snatchers* is a break with tradition.

Although featuring the usual high quality sprite graphics this game has more of a plot, in fact it has so much plot it's nearly impossible to describe.

Basically there are these birds which you control and you must preside over the development of some eggs into chicks. This involves three stages, egg collecting, egg brooding and chick rearing.

The first of these involves shooting evil egg snatchers whilst in flight. This is because you are unable to pick up the eggs yourself; when the egg is dropped by the egg snatcher you must catch it in mid air and drop it into the nest.

Other stages involve avoiding snowflakes and frogs, and pouncing on flying worms. You'll forgive me if I don't try to explain them. It's pretty wonderful, provided you have the patience to read through the instructions and figure out what you're supposed to do.

Program	*Beaky and the Egg Snatchers*
Price	*£6.90*
Micro	*Spectrum*
Supplier	*Fantasy Software, Fauconberg Lodge, 27A St. Georges Road, Cheltenham, Gloucestershire GL50 3DT*

Pick of the week

LOGO LOWDOWN

Sinclair has released *Logo* — the graphics (amongst other things) language. Those in the know (people who mumble on and on about the relative merits of one language over another) tell me it's one of the best versions of the language available on a home micro.

The package consists of the program and two manuals: Logo 1 and Logo 2. Roughly speaking, Logo 1 does what you always knew Logo could do is draw patterns using principles of maths and geometry. Logo 2 proves that you can do a great many things besides, including the manipulation of words and numbers.

As computer languages go, Logo is more fun for the 'dabbler' than most because of the construction of patterns and other wonderful things. The two manuals look excellent and would seem to cover virtually any question you could have about the use of Logo. Basic driver routines for a robot are also included as is a reference card listing the commands.

You can guess that a 48K program plus two manuals is not going to come cheap — in fact (I think) it's the most expensive Sinclair software ever at £39.95. On the other hand, it's cheap compared to its rivals and beautifully packaged. Start saving your pennies.

Program	*Logo*
Price	*£39.95*
Micro	*Spectrum*
Supplier	*Sinclair Research, Stanhope Road, Camberley, Surrey GU15 3BR*

Pared Price

Whether in the end they are the iconoclastic mould breakers they believe, Mastertronic have certainly stirred up something. Whilst as yet there's been no massive move towards reduced prices for mainstream games, companies have certainly seen that there is a market for less spectacular but cheaper games.

To this end I would guess, Cases Computer Simulations are releasing a new range called *Charlie Charlie Sugar*, which consists of various games, all of which might loosely be described as puzzles at a mere £2.99.

Matching Pairs is a souped up version of that old favourite Pelmanism (that was cribbed from the liner notes — it's not an old favourite of mine) where the player has to remember the position of various letters of designs on the reversed faces of a table of cards — the idea is to find all the pairs in as few guesses as possible or alternatively, before another player.

This computer version of the game lets you play either alone or in competition and boasts five, ever more complex patterns. It is a nice interpretation of a simple game and at the price, some people at least may find it more satisfying than the latest space shoot em up at six or seven pounds (but then what isn't). Despite the dire warnings of imminent industry collapse if games are sold for these sort of prices, for the moment, anyway, I think they are a good thing.

Program	*Matching Pairs*
Price	*£2.99*
Micro	*Spectrum*
Supplier	*Cases Computer Simulations, 14 Langton Way, London SE3 7TL*

Gulag

You may have seen some advertisements recently for a number of programs by a new company which modestly calls itself Talent and has a range of programs primarily for the Commodore and BBC.

One of the programs is an adventure called *West* about which you can read a lot more (suffice to say that it's rather special) from the likes of Tony Bridge. I decided to have a look at one of the arcade games — *Archipelago*.

The title screen on this game is absolutely wonderful — as good as *Alice in Videoland* but the game was a bit of a disappointment. *Archipelago* proved to be a maze game with very simple graphics.

Using the joystick you move a little man around a maze (which looks a bit like a crossword puzzle layout) collecting diamonds and avoiding spiders. In fact, it's not a bad game — very fast and addictive with the spiders acting very 'intelligently' as they try to entrap you.

So — marvellous title screen (a great sales job for the company's screen designer program), disappointing game graphics, but quite a fun game.

Program	*Archipelago*
Price	*£7.95*
Micro	*Commodore 64*
Supplier	*Talent, FreePost, Glasgow, G4 0BR*



MULTIOPTIONS

I wonder how the Electron is doing; it doesn't have a surfeit of programs for it — but then maybe it just hasn't been around long enough yet.

However, what programs there are come mainly from established BBC software houses, one such is Superior Software. It has released a version of that game of games, *Chess*.

It is unfair to judge something like a chess game on a quick review, you have to play a while to get the 'flavour'. What one is left with are peripheral aspects of the program.

Thus *Chess* has a lot of features — skill, speed, look ahead, etc, can all be changed — moves can be entered by cursor, coordinate or joystick. There are options for next worse move, next better move, worst move and best move play from the computer, as well as function key commands to alter display, etc.

It is, in short, a very well designed program with just about any feature you could possibly want in a chess program.

Program *Chess*
Price *£7.95*
Micro *Electron*
Supplier *Superior Software*
Regent House
Skinner Lane
Leeds
LS7 1AK

Page the Oracle

Spectrum owners may remember that a while ago — just before the release of *Valhalla* — there was what could loosely be termed an animated graphics adventure called *The Oracles Cave* by Dorcas Software.

The game featured an animated man who walked left and right, climbed ropes and fought monsters (or ran away) as instructed by key presses.

The game is on a time limit of five computer 'days' — time is ticking away all the time and whilst sleeping can restore vital energy, it also wastes time.

There is treasure to collect and a variety of more and less useful objects to be discovered as you descend through a series of caves hoping to make your escape via the Oracles Cave at the bottom level.

The game is now faithfully reproduced in a Commodore 64 version complete with hi-res graphics and turbo load. If you fancy an adventure which combines dungeons and dragons, strategy and hi res animated graphics, then it's well worth a look.

Program *The Oracles Cave*
Price *£7.95*
Micro *Commodore 64*
Supplier *Dorcas*
3 The Oasis
Glenfield
Leicester

Looking good

The first titles for the new Amstrad computer have been released. In the months before the release of the machine, Amstrad were busy arranging with a variety of well-established software houses for programs to be available in time for the launch of the machine (other hardware manufacturers please note).

Obviously a 'standard' has not been built yet for the machine and these first programs are not going to push the machine to its limits, such as some of the more recent programs on the Spectrums.

Looking at a range of new packages I chose *Spannerman* by Gem Software. On loading what you get looks rather like a Commodore 64 game I think, perhaps because of the monitor, the graphics were a little better — the details of the man's overall and cap were clearly visible. The sound was marginally worse — certainly it ought to be worse using as it does the same boring old sound chip as 80% of all micros but I did like the 'nut tightening' noise. (Note to hardware designers the new Yamaha sound chip available for some of the MSX machines is going to make even the Sid look pretty silly — be there or be square.)

The game is pretty good although infuriating. You control Spannerman whose job it is to repair a series of leaky pipes (a thought — if Spannerman is 'a man who uses a spanner in his job' then could a journalist be called Typewriterman?) before a building floods.

Aside from the sheer logistical problem of moving from leak to leak, various unlikely objects are tumbling down threatening to biff you on the head. There is a variety of life-threatening rodent that scampers back and forth along the pipes that can only be thwarted by a swift kick (shades of The Young Ones here).

I liked the game, and it represents not a bad start for the machine at all — in terms of programs what we might have in the Amstrad is the Commodore 64 plus better (slightly) graphics plus better (even excellent) Basic plus (possibly much) faster run times, minus sound quality. Things look good.

Program *Spannerman*
Price *£7.95*
Micro *Amstrad CPC 464*
Supplier *Gem Software*
Brentwood House
169 Kings Road
Brentwood
Essex CM14 4EF

Battling Bikers

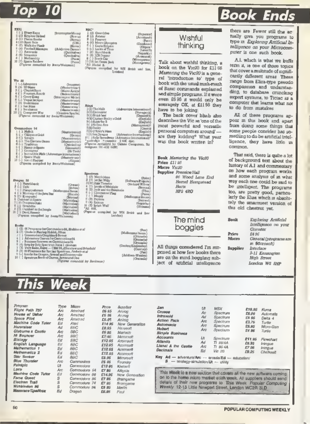
What a lot of people said they didn't like about *Chequered Flag*, Psion's car race program, was the absence of competing cars. All you could do was try to better your own lap time on a variety of circuits.

Full Throttle is the latest release from Micromega whose excellent Star Trek style game *Codename Mat* is still high in the charts. It does for motorbike racing what *Chequered Flag* didn't do for cars, ie, it puts competitors on the track.

Many of the technical effects on the game would seem to have been derived from another Micromega game from the same author — *Deathchase*. As you zoom around the track other bikes weave in front of you, try to pass you and generally make life difficult; hit one and you lose valuable position time. You have to manoeuvre your bike not only, therefore, around the bends and swerves of the track, but through the dense group of fellow bikers — no easy task.

Sensibly Micromega have kept the controls simple: bank left, bank right, accelerate and brake. There are a variety of different courses based on real tracks with differing properties and demanding differing skills. Fun to play and technically very clever.

Program *Full Throttle*
Price *£6.95*
Micro *Spectrum*
Supplier *Micromega*
230-236 Lavender Hill
London SW11 1LE



Top 10

ZX81

1 ( ) Krazy Kong (Interceptor Micros)
2 (5) Krypton Ordeal (Novus)
3 (6) Flame Books (Novus)
4 (10) Race Rain (CRL)
5 (7) Walk the Plank (Novus)
6 (4) Football Manager (Addictive Games)
7 (1) Asteroids (Quicksilva)
8 (9) Scramble (Quicksilva)
9 ( ) Mothership (Pixies)
10 (7) Space Raiders (Psion)
(Figures compiled by Boots/Websters)

BBC*

1 (2) Overdrive (Superior)
2 (3) Aviator (Acornsoft)
3 (1) Fosenon (Psion)
4 (4) Micro Olympics (Database)
5 ( ) Eagle Empire (Alligata)
6 (–) Lords of Time (Level 9)
7 (6) Hunchback (Superior)
8 (8) JCB Digger (Acornsoft)
9 ( ) Stock Car (Micropower)
10 (10) Jet Power Jack (Micropower)
*All Model B.
(Figures compiled by WH Smith and Son, London)

Vic 20

1 (–) Adventure (Imagine)
2 (9) 3D Maze (Mastertronic)
3 ( ) Chariot Race (Micro Antics)
4 ( ) Phantom Attack (Mastertronic)
5 ( ) Crazy Kong (Interceptor Micros)
6 (–) Vegas Jackpot (Mastertronic)
7 (3) Undermaze (Mastertronic)
8 ( ) Sea Mine (Mastertronic)
9 ( ) Breakout (Mastertronic)
10 (1) Computer War (Creative Sparks)
(Figures compiled by Boots/Websters)

Atari

1 (2) The Hulk (Adventure International)
2 (3) Encounter (Novagen)‡
3 (1) Strike Mal (Domark)‡
4 (4) Captain Sticky's Gold (English)
5 (–) Airstrike II (English)
6 ( ) Hellcat Ace (Microprose)†
7 (6) Becky (Centra)
8 (5) O'Riley's Mine (English)
9 (9) Sea Dragon (Adventure International)
10 ( ) Rally Speedway (Adventure International)*
*cartridge †cassette ‡ disc.
(Figures compiled by Calisto Computers, Birmingham 021-632 6458)

Commodore 64

1 ( ) Hulk (Mastertronic)
2 ( ) Gilligan's Gold (Ocean)
3 ( ) Squirm (Mastertronic)
4 (–) The Election Game (Mastertronic)
5 (–) Tracheus (Quicksilva)
6 ( ) Sheep in Space (Llamasoft)
7 ( ) Encounter (26 Tools)
8 ( ) Incredible Hulk (Adventure International)
9 ( ) Space Walk (Mastertronic)
10 (–) Sons of Blagger (Alligata)
(Figures compiled by Boots/Websters)

Spectrum

1 (2) Match Mine (Psion)
2 (1) Jet Set Willy (Software Projects)
3 (10) Mate Thresher (Richard Wilcox)
4 (7) Lords of Midnight (Beyond)
5 (2) Jack and the Beanstalk (Thor)
6 (–) Chequered Flag (Psion)
7 ( ) Moggy (Melbourne House)
8 (3) Psytron (Beyond)
9 (4) Zaxxon (Starzilla)
10 (8) Sabre Wulf (Ultimate)
*All 48K.
(Figures compiled by WH Smith and Son London)

Dragon 32

1 ( ) Hunchback (Ocean)
2 ( ) Ugh! (Softek)
3 ( ) Hungry Horace (Melbourne House)
4 ( ) Mystery of the Java Star (Shards)
5 (6) Kriegspiel (Beyond)
6 Cuthbert in Space (Microdeal)
7 (10) Dragon Raid (Microdeal)
8 ( ) Scramble (Microdeal)
9 ( ) Cuthbert in the Jungle (Microdeal)
10 ( ) Devil Assault (Microdeal)
(Figures compiled by Boots/Websters)

Books

1 (2) 66 Programs for Commodore 64, *Erskine et al* (Pan)
2 (7) Guide to Playing Hobbit, *Elkan* (Melbourne House)
3 ( ) Commodore Graphics & Sound (Granada)
4 ( ) Adventure Games for Commodore 64 (Granada)
5 ( ) Business Systems on Commodore 64 (Granada)
6 (4) Jump by Jump Spectrum Book 1, *Graham* (Dorling Kindersley)
7 (3) Very Basic, Kaps — CBM 64, *Ellershaw and Schofield* (Century)
8 (8) 60 Programs for Sinclair Spectrum, *Erskine et al* (Pan)
9 (–) Inside the Dragon, *Smeed and Sommerville* (Addison-Wesley)
10 ( ) Spectrum Book of Games, *James and Gee* (Granada)
(Figures compiled by Bookwise)

Book Ends

Wishful thinking

Talk about wishful thinking, a book on the Vic20 for £11.95. *Mastering the Vic20* is a general 'introduction to' type of book with the usual mish-mash of Basic commands explained and simple programs. If it were even £6.95 it would only be averagely OK, at £11.95 they have to be joking.

The back cover blurb also describes the Vic as 'one of the most powerful and versatile personal computers around' — are they kidding? What year was this book written in?

Book *Mastering the Vic20*
Price *£11.95*
Micro *Vic20*
Supplier *Prentice/Hall*
66 Wood Lane End
Hemel Hempstead
Herts
HP2 4RG

The mind boggles

All things considered I'm surprised at how few books there are on the mind boggling subject of artificial intelligence there are Fewer still that actually give you programs to type in. *Exploring Artificial Intelligence on your Microcomputer* is one such book.

A.I. which is what we buffs term it, is one of those topics that cover a multitude of significantly different areas. These range from Eliza-type pseudo compassion and understanding, to database crunching expert systems, to Tictac as a computer that learns what not to do from mistakes.

All of these programs appear in this book and apart from doing some things that some people consider has something to do be artificial intelligence, they have little in common.

That said, there is quite a lot of background text about the history of A.I and commentary on how each program works and some analysis of in what way each one could be said to be intelligent. The programs too, are pretty good, particularly the Eliza which is absolutely the smartuest version of this old chestnut yet.

Book *Exploring Artificial Intelligence on your Comuter*
Price *£4.95*
Micro *General (programs are in Microsoft)*
Supplier *Interface*
9-11 Kensington
High Street
London W8 5NP

This Week

Program	Type	Micro	Price	Supplier
Flight Path 737	Arc	Amstrad	£6.95	Anirog
House of Usher	Arc	Amstrad	£6.95	Anirog
Space Pilot	Arc	Amstrad	£6.95	Anirog
Machine Code Tutor	Ed	Atari	£14.95	New Generation
Hareraiser	Ad	BBC	£8.95	Haresoft
Glaburna's Castle	Arc	BBC	£6.95	Martech
Hi Bouncer	Arc	BBC	£7.95	Mirrorsoft
Biology	Ed	BBC	£12.65	Acornsoft
English Language	Ed	BBC	£12.65	Acornsoft
Mathematics 1	Ed	BBC	£12.65	Acornsoft
Mathematics 2	Ed	BBC	£12.65	Acornsoft
Star Seeker	Ed	BBC	£9.95	Mirrorsoft
Blue Thunder	Arc	Commodore	£6.95	Foundry
Paintpic	Ut	Commodore	£19.95	Kiwisoft
Lora	Arc	Commodore 64	£7.95	Alligata
Machine Code Tutor	Ed	Commodore 64	£14.95	New Generation
Fame Quest	S	Commodore 64	£7.95	Bramgame
Electron Trail	S	Commodore 74	£7.95	Bramgame
Wimbledon 64	S	Commodore 64	£8.95	Merlin
Mazerace/Spellbox	Ed	Dragon	£6.95	Paul
Zen	Ut	MSX	£19.95	Kuma
Crusoe	Ad	Spectrum	£6.00	Automata
Intravoid	Ad	Spectrum	£4.95	Delta 4
Action Pack	Arc	Spectrum	£3.75	Turtle
Automania	Arc	Spectrum	£6.95	Micro-Gen
Hubert	Arc	Spectrum	£4.95	Turtle
Simple Business Accounts	Ut	Spectrum	£11.95	Flowchart
Atlantis	Ad	TI 99/4A	£6.95	Intrigue
Lionel & the Castle	Arc	TI 99/4A	£7.95	Intrigue
Decimals	Ed	Vic 20	£9.25	Chalksoft

Key **Ad** — adventure/**Arc** — arcade/**Ed** — education/
S — strategy-simulation/**Ut** — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD

A fast buck

The campaign against piracy of computer programs has begun to increase pace, with a ten-minute rule Bill being introduced in Parliament on July 24

It seems as if the Bill will have the support of the Government because it is felt that the computer industry should be in a position to protect itself against unlawful copying It is true, unfortunately, that the one good reason to distribute software with an essential manual is that the law of copyright applies to the manual.

In the case of some microcomputer products, the sales of books and manuals to accompany software far exceed the sales of the software itself. It *could* be that there are many people using the same software on one machine, and each wants a personal copy of the documentation. But it is far more likely that each manual will accompany a separate pirated copy of the software

The Bill is expected to include provisions for unlimited fines, and up to two years in jail, for those who copy, with lesser penalties for those who sell.

So, who are the copiers against whom the Federation Against Software Theft (FAST) wishes the Bill enacted?

There are those who use systems on mainframes, which are illegally copied from systems at other installations By the very nature of large installations such copying is difficult to conceal and, as software is usually sold on licence, the origin of the copy is not that difficult to ascertain and prosecute If the Bill aims to curb industrial espionage, there are legal remedies already in existence

In contrast, there is the microcomputer games player who is part of a 'copying collective" Originals of games are bought, and then multiple copies are made to be exchanged for other copied games. There may be micro games players who have no copied games in their possession, but they are rare creatures

Micro games players tend to be young, and the Draconian measures envisaged in the Bill seem somewhat mediaeval in nature for this category of offenders The number of such juvenile offenders is into the millions, and so a Bill, if stringently enforced, will bring the legal system to a halt.

The Bill, therefore, cannot be applied to minors, and — even if parents were held responsible — could not be applied to many So at best, the Bill will help curb only the commercial scale games pirate and will do nothing to solve the main problem — home copying The main impetus behind FAST and the promoters of the Bill comes from the games companies. Games are by their nature ephemeral. And games producers and retailers have consistently over-estimated the size of the market.

Their theory goes that if there was less copying many more games would be sold This is a hypothesis the truth of which I strongly suspect. The total amount of money spent on games would not greatly increase, and players would swap originals rather than copies.

You cannot stop mass copying — or swapping — by individuals rather than organisations using legislation.

To create an industry based purely on entertainment is always dangerous, and for micro games the bucks are FAST running out

Boris Allan

All square

Puzzle no 118

"Here is an interesting problem," remarked Professor Hex, at the monthly meeting of Mathemaholics Anonymous. "Can you find a perfect cube that is two million more than a perfect square?"

There was a moment's silence before a voice announced "Twenty-seven million!" Sure enough twenty seven million, the cube of three hundred is just two million more than twenty five million the square of five thousand. "Er yes" mumbled the Professor reddening slightly at being caught so early "That wasn't the answer that I was thinking of."

Can you find an alternative answer?

Solution to Puzzle no 113

We know that Alison must have earned an amount (in whole pence) somewhere in the range 1p to £3 40 If we knew this amount, all the other sums earned are determined by subtracting the known value from each pair in turn along the line.

However, each amount must be positive and also the sum raised by Alison, Chris and Elisabeth must equal £5 18

The program tests every value possible for Alison's total, works out the remaining sums and prints any possible results found.

```
10 FOR A = 1 TO 340 20 LET B = 341 - A 30 LET C = 267 - B 40 LET D = 223 - C 50 LET E = 463 - D 60 IF C > 0 AND D > 0 AND E > 0 AND A + C + E = 518 THEN PRINT A B C D E 70 NEXT A
```

This gives the following result. Alison, £1 27, Ben, £2 14 Chris £0 73 Derek, £1 50 and Elisabeth, £3 18

Winner of Puzzle No 113

The winner is Mr C S Gwilliam, Sheppard Way Minchinhampton, Stroud, Glos, who receives £10.

Rules

If the puzzle can be sensibly solved using a computer then the winner will have included a listing of the program used to find the correct answer The closing date for entries to Puzzle No 118 is August 17

The Hackers





PIMANIA-The Cult Adventure 48K Spec £10
CRUSOE M/C Adventure 48K Spec £6
OLYMPIMANIA M/C Arcade 48K Spec £6
PIROMANIA M/C Arcade 48K Spec £6
PI-IN'ERE M/C Arcade 48K Spec £6
PI-BALLED M/C Arcade 48K Spec
PI-EYED M/C Arcade 48K Spec £6
MORRIS/BIKERS M/C Arcade Any Spec
GO TO JAIL Family Fun 48K Spec
DARTZ Family Fun 48K Spec £5
YAKZEE Family Fun 48K Spec/Dragon £5
THE PIMAN'S GREATEST HITS
"I'M A PIMANIAC" – T-Shirts
JOIN THE PIMANIACS CLUB
I ENCLOSE THE RIGHT MONEY, OR DEBIT MY ACCESS/VISA CARD
CARD NUMBER
MY SIGNATURE
MY NAME
MY ADDRESS
POST CODE
NO EXTRAS! ALL OUR PRICES INCLUDE DELIVERY AND V A T
AUTOMATA U K LTD
CREDIT CARD HOTLINE
THE LATELY PERIPATETIC ORDER FORM HAVING FINALLY COME TO REST, THE PANELS ASSEMBLE THEMSELVES TO RELATE THIS EPISODE IN WHICH THE PIMAN AND THE REST OF THE CAST OF THE FORTH-COMING 'PIROMANIA' DISCUSS THEIR PARTS
.. THAT'S A CUE FOR ME TO FLY INTO VISION, SQUIRTING AWAY WITH MY TRUNK..
.. AND WHILE I'M LIGHTING THIS FIRE, "WALTER HOSE" – THAT'S YOU, RODNEY – COMES IN WITH THE....
TAKE FIVE, BOYS.
YOU'RE SHOWING YOUR AGE, CHRISTIAN – YOU CAN'T GET THAT CHOCOLATE BAR ANY MORE!
NO, LISTEN – THE ELEPHANT WILL HAVE TO CHANGE HIS NAME
.. WE'RE GETTING FLACK, NOT TO MENTION LAWSUITS FROM PEOPLE WHOSE EGOS LEAD THEM TO BELIEVE WE'RE CARICATURING THEM ON THIS PAGE – SO I THINK, CYRIL, WE'D BETTER CALL YOU JUMBO OR SOMETHING
NO, NOT JUMBO – HOW ABOUT SOMETHING CLEVER .. LIKE L E PHANT?
JUST AS YOU LIKE NOW, THE OTHER THING IS, I'M A BIT WORRIED THAT SOME OF US ARE GETTING TOO WRAPPED UP IN OUR RÔLES
Gremlin Evans
LIKE, WE USED TO REHEARSE AT PI-WOOD STUDIOS....
PI WOOD STUDIOS IS NOW IN ASHES!
AND THE OTHER WEEK WE WENT TO YORKIEMINSTER
YOU WANDERED OFF "TO SEE THE BUILDINGS"
NEXT THING
SHO.. TRYIN' TO FRAME DA PIMAN! WELL, GET DIS HERE, PILLOW-CASE MAN.. I DIDN'T HAVE NOTHIN' TO DO WITH THOSE BURN-UPS — NOTHIN', D'YA HEAR? I DON'T TAKE NO RAP, 'COS PI FOLK DON'T PLAY WIT' FIRE BESIDES NO DIRTY RAT TURNED UP TO CLAIM MY BONSIAL LAST WEEK!!!!
THAT WAS MY 'EDWARD G AS "LITTLE CHEESER"' VOICE
IT WUZ JOOS LIKE 'IM
WELL – I CAN SMELL BURNING NOW!!
YIPE
ALL RIGHT PIMAN – I TAKE YOUR WORD FOR IT YOU'RE NOT A REAL PYROMANIAC – BUT GET RODNEY TO PUT ME OUT!
SORRY, SUNSHINE – I'M NOT A REAL FIREMAN, EITHER!